

THE BIOLOGIST



Vol. XIV, No.2

March-May, 1933

ILLINOIS

(Rho) Miss Florence M. Roy, 109 Women's Bldg., Urbana, Illinois.

FLORIDA

(Sigma) Mr. Paul W. Calhoun, Experiment Station, Gainesville, Florida.

DUKE

(Tau) Mr. Lewis E. Anderson, Box 4626, Duke Station, Durham, N. C.

MIAMI

(Upsilon) Miss Jean Pfau, 35 Bishop Hall, Oxford, Ohio.

NEW HAMPSHIRE

(Phi) Mr. Cecil V. Creath, Theta Upsilon Omega House,
Durham, New Hampshire.

MONTANA STATE

(Chi) Miss Sarah Jane Barringer, Pi Beta Phi House, Bozeman, Montana.

WASHINGTON

(Psi) Mr. John R. Roberts, Botany Department, University of Washington,
Seattle, Washington.

OKLAHOMA

(Omega) Miss Helen Joe Talley, University of Oklahoma, Norman, Oklahoma.

SOUTHERN CALIFORNIA

(Alpha Alpha) Mrs. Cora Mae Life, University of Southern California,
Los Angeles, California.

MOUNT UNION

(Alpha Beta) Miss Edith E. Brown, Elliott Hall, Alliance, Ohio.

SOUTH DAKOTA

(Alpha Gamma) (*Inactive*) Mr. Albert Fauth, 309 Lewis St., Vermillion, S. D.

LAWRENCE

(Alpha Delta) Mr. Norman Schmeichel, 909 N. Appleton St.,
Appleton, Wisconsin.

PITTSBURGH

(Alpha Epsilon) Miss Kathryn A. Gilmore, Zool. Dept., University of
Pittsburgh, Pittsburgh, Pa.

WILLIAM AND MARY

(Alpha Zeta) Miss Virginia Showalter, Box 524, Williamsburg, Virginia.

OKLAHOMA A. & M.

(Alpha Eta) Miss Frances S. Kornfeld, Thatcher Hall, Stillwater, Oklahoma.

WASHINGTON STATE

(Alpha Theta) Mr. John S. Bixby, 802 Linden, Apartment 4,
Pullman, Washington.

BUCKNELL

(Alpha Iota) Miss Anna Rohland, Box 223, Women's College,
Lewisburg, Pennsylvania.

HUNTER

(Alpha Kappa) Miss Marie Kravietz, 168 E. 66 St., New York, N. Y.

UTAH

(Alpha Lambda) Mr. Frank P. Giles, 1057 Hollywood Ave.,
Salt Lake City, Utah.

THE NATIONAL CONVENTION

Official Announcement

THE 1933 convention of Phi Sigma will be held this summer, June 26 and 27, at Chicago. The Stevens Hotel, headquarters of the American Association for the Advancement of Science, will also be our headquarters.

Not all details of the meeting are available at present, but we are planning a business meeting for Monday, June 26, and scientific sessions both morning and afternoon of Tuesday, June 27, for the reading of papers by members. If either the business sessions or scientific sessions are not finished on the days allotted, additional time will be available Wednesday morning, June 28.

The banquet for all delegates and other Phi Sigma members present will be held Monday evening, June 26, and it is hoped that President A. G. Ruthven, of the University of Michigan, our National President, will be the speaker.

Delegates

EACH chapter is entitled to one delegate. Your chapter should elect this delegate and an alternate at once, if this has not already been done. Railroad fare (only) of the delegate will be paid in advance by the National Treasurer. The delegate or his chapter must be prepared to pay other expenses, such as hotel bill and meals. It is, of course, understood that all national financial obligations of your chapter must be met well in advance of the convention date; if this is not done, representation will be denied.

The delegate you have chosen should make reservations *at once* at the Stevens Hotel, in order that a room

may be obtained before all of the less expensive ones are taken. Your delegate is, of course, free to choose any hotel he wishes, and many may wish to reserve a room in a less expensive hotel.

Chapter Reports

CHAPTER reports must be brought to the meeting and turned over to the National Secretary by the delegate. It is expected that the chapter officers will co-operate in writing this report. The chapter report is to include all of the more important events of the chapter for the time since the last convention (Cleveland, December, 1930). As a part of this report, a financial statement should be included.

Railroad Rates

THE arrangements for reduced railway rates (a fare and a third or a fare and a half for the round trip, on the certificate plan) have been made in the name of the American Association for the Advancement of Science, but are to be available to members of any society meeting with the Association at that time. Members of Phi Sigma should secure railway certificates when purchasing tickets to Chicago, stating that they are to attend the meeting of the American Association for the Advancement of Science. The rates are available from practically all over the United States and Canada. Certificates should be left at the registration room at the time of registration, in order that they may be endorsed by the A. A. A. S., and validated by the railway agent. They will later be returned to their owners and will then entitle the holder to purchase a return ticket at one-half of the regular one-way fare. There

is a registration fee of \$2.00 (\$1.00 for members of the A. A. S., in good standing).

Convention Business

EACH chapter is expected to send in to this office at the earliest possible date a list of all matters which it wishes discussed at the business meeting of the convention. It is obvious that this is the only way that your National Officers have of knowing your wishes, and it is hoped that if your chapter has any opinions to express, any criticisms to offer, or any desires which may affect the national organization, you will indicate them in a letter at the earliest possible moment. If the chapters co-operate in this way, it will be possible for me to summarize such letters and lists, and prepare a letter which will be sent to each chapter for consideration *before* the convention. Each delegate should come to the convention instructed by his chapter on these questions, *but* he should in any case be left FREE to vote as he thinks best *after* he hears the discussion at the convention.

Scientific Session

AS has been the custom, the second day (Tuesday, June 27) has been reserved for the reading of papers by members, and also for any other junior research worker who may care to present a paper, in case such a person is from an institution not having a chapter of Phi Sigma. The Council reserves the right to reject any paper not presenting original work in which the author has at least participated. It is not expected that papers given by the junior research workers be long or erudite or profound—merely that they give the results of any research carried on by the member.

Titles with abstracts of not over two hundred words should be sent to this office *not later than May 20*. Please make every effort to have your chapter represented not only by your official delegate, but by several papers which are to be read at the scientific session. Please send the *titles* and *authors* of papers for your chapter at the earliest opportunity, even though abstracts cannot be sent until later. It is understood that abstracts of papers read will be published in the next number of the "Biologist".

It is the sincere hope of your National Officers, who are giving their time to the good cause for which Phi Sigma stands—the encouragement of the spirit of research among young biologists—that each chapter will do its best and co-operate to the fullest in making this convention the best Phi Sigma has ever held.

A. I. ORTENBURGER,
National Secretary.



BIOLOGY ON PARADE

A Century of Progress Exposition to Offer Thrilling Demonstrations

HOW life takes form—evolution from the primitive cell to its highest organization in man—made plain to the non-scientific observer, is the purpose of the comprehensive biology section in the Hall of Science at A Century of Progress, the Chicago World's Fair of 1933.

Concealed neon illumination makes the south view of the Hall of Science a captivating scene at night. In the background may be seen the 176-foot tower bathed in mysterious light. In the foreground is a neon-tinted canopy and one of the architectural features capped by light.



The simple cell, unit from which all living forms, both animal and plant, are constructed, is the foundation. A complete biological laboratory will be at work. Cell activities will be demonstrated and illustrated by models of magnified cells. Methods of scientists in isolating and

studying the cell will be shown so that the layman will be able to understand how these basic facts of life are known.

Complete story of the development of the human being from the cell is told in the Embryological exhibits. Moving magnified cells will illustrate how cells of different characteristics from both parents unite to form a new individual.

To illustrate heredity through the cell combinations a series of cages of healthy guinea pigs, of different colors and rough and smooth fur, will show how these characteristics are transmitted and combined in successive generations. Photographs and charts will show how the same results follow in human families.

Moving models of the developed human being will show the finished physical machine in its internal action. A life sized model of a man will exhibit the circulation of the blood, a magnified heart pumping, showing the action of the valves, red blood flowing out through the arterial system and blue blood returned by the veins. A simplified mechanical reproduction of the digestive system will portray the absorption of food elements by the body.

Two moving models of outstanding interest will display the physical mechanism of speech and thought.

A model of the chest and throat will show the different characteristics that produce high or deep voices. The lungs will move, the ribs expand and the larynx will vibrate. With different movements a bass and a soprano voice will be heard.

A magnified model of a human brain will show the areas that are in operation in the acts of speaking, hearing, seeing or writing. By touching the corresponding button the controlling part of the brain model will be lighted up from the interior.

Marriage of plant cells will be shown in action by an exhibit depicting gigantic dahlia stalk twelve feet tall. Into the flower from another plant drops a pollen grain, moves down to the ovule and, in four stages, the united cells produce a living seed containing the miniature baby plant.

How food is produced in plants only in daylight will be portrayed by a series of moving models of the cell structure of a corn stalk. Circulation through the cells of oxygen, carbondioxide and water vapor shows the plant breathing out oxygen while the combination of the water and carbon dioxide produces glucose. Two phases are shown, day and night. At night the plant gains size but food elements are formed only under sunlight and not by specific rays but the natural complete radiation of all the suns rays.

How trees grow is to be shown by one of the most remarkable moving models in the Exposition. A section of a Basswood twig, magnified to seven and one-half feet in diameter, representing a branch three years old, adds a year of growth in seventy-five seconds, becoming nine feet in diameter by the accretion of new material.

Central feature of the section on marine biology will be the actual bathysphere in which Dr. William Beebe, the famous deep-sea explorer, descended to the depth of 2,200 feet, the steel globe being required to sustain a pressure of 1,000 pounds to the square inch. Near this will be seen the companion miracle of applied science, the aluminum globe in which Dr. Auguste Piccard ascended 54,000 feet into the stratosphere.

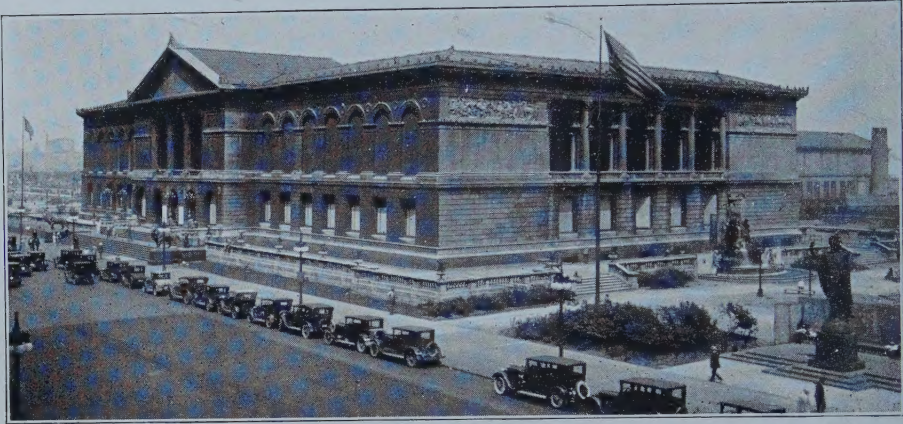
A model of Dr. Beebe's famous oceanographic ship, the *Arcturus*, will be shown afloat with reproductions of the special nets and pipe drags bringing up specimens from 3,000 feet. There will also be a section model of the "Atlantis" newest and most complete of deep-sea exploration vessels. Sea and amphibian life of the present day, but presenting almost the characteristics of prehistoric ages, is to be shown in a diorama in color in three dimensions of one of the islands of the Galapagos group.

Considered by scientists one of the most remarkable exhibits in the biological section is the micro-vivarium. Microscopic marine life is shown in actual life enlarged thousands of times. Pin point drops of water are the theatre. Powerful microscopes will look through them and throw the living scene upon the screen, showing the weird and monstrous creatures swimming, eating, making love and fighting in their infinitesimally minute world.

Comparative with this, a bacteriological laboratory will be in operation, showing the technique of science in rearing and studying bacteria.

Distribution of plant life over the globe will be shown by an illuminated glass map indicating in color the seven great vegetation areas over the world's land masses. Detail paintings of these areas will be shown in this section, featuring the dominant animal life with the characteristic plants of the regions, from arctic tundras to tropical jungles.

To sum up the field of knowledge covered by this vital department of science a Synoptic Review of Biology is planned by Dr. Jay F. W. Pearson, in charge of the Biology Section of *A Century of Progress*. By this display, making use of lantern slides and preserved materials the subject will be rounded up in a brief survey of human knowledge of evolution at the present day.



Watchful lions guard the art treasures of the Exposition in the Art Institute on Michigan Boulevard.

Approximately 2,000 works of art will be exhibited at the forthcoming exhibition at A Century of Progress—Chicago's 1933 World's Fair—to be held in Chicago June 1—November 1. The exhibits will be housed in the Art Institute of Chicago.

Director Robert B. Harshe, who, with members of his staff, has been negotiating for the most important masterpieces during the past three years, has nearly completed the catalogue of works to be shown.

Twenty-two American museums and more than 200 private collectors have agreed to lend their treasures for exhibition.

The exhibits will be arranged in sequence, one series of galleries containing masterpieces from the twelfth century to 1933. Nine galleries will be devoted to the primitives and old masters, such as Rembrandt, Titian, Velasquez, etc.

A "Century of Progress" in painting will be shown in a parallel way; great French masters and American masters.

Rooms will be set aside for such artists as Degas and Monet, Manet and Renoir, Gauguin and Toulouse-Lautrec, Van Gogh and Henri Rousseau, with a one-man gallery for Cezanne.

In another series, Whistler, Sargent, Homer, Ryder, Eakins and others will be shown by large and important groups.

Contemporary groups will include a representative survey of American and foreign art. Sculpture will be amply represented by significant exhibits and a parallel exhibition of drawings, etchings, lithographs, engravings, etc., will be installed in the spacious print galleries on the first floor.

THE CHANCELLOR'S MESSAGE:

THE coming convention of Phi Sigma, to be held at Chicago in June, should enrich the activity and interest of every chapter sending a representative. As a background to the business and scientific sessions stands a world's fair which will be preeminent for the character of its scientific features. It is safe to say no delegate will soon forget his experiences.

In the difficult task of selecting representatives let me suggest that the chapters give some thought to what will be brought back as a contribution to chapter work next year. It goes without saying that the delegate should be interested in and acquainted with current problems in the organization. He should preferably, too, be able to represent the chapter with a contribution to the scientific program. But it is also highly important that he be able to catch the significance and spirit of the events which he will witness in Chicago during his stay, and give his associates the full value of them when activities are resumed in the autumn.

Not every world's fair has been equally successful from the financial standpoint, but every one has made its contribution to American life. Two in particular have been significant milestones—The Philadelphia Centennial in 1876 and the Chicago Exposition of 1893. These, with the British Exposition sponsored by Prince Albert in 1851 and the Paris Exposition of 1900 have been of inestimable value to scientific workers in winning them popular appreciation and support.

Dramatic settings which the laboratory cannot afford will be present at Chicago. The latest devices for visual instruction are to be utilized. Many suggestions which future teachers and investigators can use directly will be on hand. Nor should we forget that each pageant of this type may make a great impression upon the artistic and industrial life of the nation. As scientists we may often have to restrict our professional attention to a narrow field. Yet we all have the business of living to do and cannot afford to lose touch with those things which lie beyond the horizon of our work-tables.

Let every chapter be well represented at the coming convention!

PAUL B. SEARS, *National Chancellor*,
University of Oklahoma, Norman, Okla.

On to Chicago!

UNIQUE in the history of Phi Sigma National Conventions is the opportunity, presented this year, of combining work with pleasure. The National Council, at its last regular session in New Orleans, took upon itself the responsibility of delaying the date of this Convention in order that many members of the Fraternity besides the official delegates might have the chance to attend the meetings and during the same week find themselves at a session of the American Association as well as at a World's Fair. Carfare and hotel bills are difficult to pay in these hard times but it is the hope of your National Council that just as many of you as possible will find a way to get to Chicago and then find a way to stay there long enough to see the show.

If the old bus holds together I shall be there. If I can keep her going you can all ride in my rumble seat to the Fair. Let's go!

PAUL A. WARREN, *Vice Chancellor*,
Tufts College, Medford, Mass.

The National Treasurer Says:

To the Chapters of Phi Sigma:

AS this last issue of the Biologist goes to press, I am not in a position to state positively what percentage of the railroad fares I am going to be able to advance in cash before the convention meets, due to the abnormal banking situation. The bank where the greater part of the Society funds are on deposit is now operating under a conservator and part of the deposits may be frozen until a later date. If that is the case I will endeavor to provide the money myself but due to conditions I may not be able to get the entire amount. At any rate it will be advanced to all in the same proportion.

The question has been raised as to delegates forming auto parties and in that way attending the convention. It is no difference as to how they travel as the money will be paid the same as if they go via train, and as much in advance as conditions will permit.

ERWINE HALL STEWART,
National Treasurer.

THE FAIRYLAND OF FACT

A World in Miniature

A WORLD of wonder concentrated into 424 magic acres of land and water. An encyclopedia come to life, with thrilling chapters told by means of animated displays.

Thus has A Century of Progress—Chicago's 1933 World's Fair—been called by the million persons who have already obtained a preview and learned the details which will be unfolded to the public when the Exposition opens officially on June 1.



Replica of the Golden Temple of Jehol, celebrated Chinese Lama Temple, at A Century of Progress—Chicago's 1933 World's Fair. This replica is the gift to the Exposition of Vincent Bendix, millionaire industrialist, who commissioned Dr. Sven Hedin, noted Swedish explorer, to bring to Chicago the finest existing example of Chinese Lama architecture. The Golden Pavilion, seat of worship of the Manchu emperors, was copied faithfully by North Chinese architects and artisans, shipped in 28,000 pieces to Chicago and put together like the parts of some huge Chinese puzzle. The roof is of copper shingles covered with gold leaf. The pillars are lacquered in red. Within are images of Buddha and other Lama gods, incense burners, oil lamps, prayer wheels, pagodas, temple bells, painted wall banners and the other interesting paraphernalia of this fast vanishing form of worship.

The world of today, the world of tomorrow and the world of yesterday, will be placed on parade. Attractions of historic and educational interest, which would require a trip half-way round the world if one sought them individually, may be seen here for the admission price to the grounds—fifty cents for adults and twenty-five cents for children, *exactly what it was to the World's Columbian Exposition of 1893.*

Other costs of visiting the Fair—transportation, rooms and meals—will depend upon the individual visitor.

Reduced railroad fares to Chicago from all points of the country have already been announced by the different passenger associations.

A survey of Chicago hotels shows that the cost of a room, depending upon the hotel's location, ranges from \$1.50 a day to \$5. Rooms will be obtainable in private homes and boarding houses at \$1 a day per person.

Meals in the various hotels run from 50 cents to \$1, while sandwiches may be obtained on the Fair grounds at 5 and 10 cents apiece.

Admission to the concessions—sixty in number—will be popular in price—ten to fifty cents.

But the 50 cents general admission will open the gates to a world of enchantment—new wonders of science, and industry, new architecture, new thrills, new diversions, new ideas—presented in a setting of green parks, mirror-like lagoons, flower gardens, and tree-lined drives.

The general gate admission will admit one to all the exhibit buildings constructed by A Century of Progress, including: (1) Agricultural Building, (2) Communication and Radio Building, (3) Dairy Building, (4) Electrical Building, (5) General Exhibits Group of five pavilions, (6) Hall of Science, (7) Hall of Social Science, (8) Home Planning Hall, (9) Mayan Temple, (10) Hall of States and (11) Travel and Transport Building. It will also admit one to those exhibit buildings constructed by outside interests, namely: (1) Federal Building, (2) Illinois Host Building, (3) American Radiator Building, (4) Christian Science Monitor Building, (5) Chrysler Building, (6) Edison Memorial, (7) Firestone Building, (8) General Motors Building, (9) Johns-Manville Building, (10) Hall of Religion, (11) Sears-Roebuck Building, (12) Southern Cypress Building, (13) Time, Inc. and (14) the eight modern homes in the Home and Industrial Arts Exhibit.

By day the grounds will be a fascinating panorama of color, with crowds of people moving against the background of windowless buildings. By night they will be transformed into a fairyland of light, bath-

ing the buildings in mellow tints and projecting an everchanging series of spectacular lighting effects.

While the story of science's contributions to human progress will be the nucleus of the exhibits scheme, it will not be a dry and uninteresting presentation, but a vivid, swift-moving spectacle.

Scientists on the staff of the Exposition, aided by members of the National Research Council, have prepared exhibits that will unfold in entertaining, understandable fashion, many of the mysteries of nature in the great Hall of Science. Physics, chemistry, mathematics, biology, geology and astronomy and their contributions to human progress will be presented.

These exhibits, together with hundreds of others showing advancement in the mode of transportation by train, automobile and steamship, the new and old systems of agriculture, the epic story of electricity, the century's advance in a thousand and one industrial processes will be shown free of charge to the millions of persons visiting the Exposition this summer.

A Century of Progress, however, will not be merely an instructive or educational celebration. There will be features to thrill and delight visitors of all ages. People visit World's Fairs primarily to be amused and made to wonder. They may be educated by what they see and their minds enriched by new ideas acquired, but essentially they are in a holiday mood, receptive to thrills and recreation.

For this reason much thought was given to the development of amusement features. On the Midway will be breath-taking rides and thrilling amusement attractions. Elsewhere will be colorful historical reproductions, exotic presentations of the life, rites and customs of people of distant lands, historical pageants, music, sports programs and entertainment features of new and unique description.

The supreme amusement thrill of the Fair will be the Sky-Ride. The lofty towers of this \$1,200,000 attraction, will be 628 feet high—taller than the Washington Monument or any Chicago building.

At the 200 foot level the tower will be connected by steel cables, along which suspended rocket cars will travel back and forth across a mirror-like lagoon. The span between the towers will be 1,850 feet, greater than the span of all but a few of the huge suspension bridges of the world.

Never before have such elaborate preparations been made for entertaining children. The Enchanted Island, or official children's playground is already rapidly approaching completion on Northerly Island.

Here youngsters may romp in a story-book atmosphere while their parents are viewing the sights of the Fair.

This land of make-believe will feature a magic mountain, a tiny railroad which winds its way over strange lands, through weird caves and along the shore of an apparently boundless ocean; a children's theater, trained animals and clowns.

For motorists who drive to Chicago there will be officially certified tourist camps on the outskirts of the city. Here the automobile driver may leave his car with perfect safety and commute to the grounds on rapid transit lines.

Fourteen major highways entering Chicago will have special names and markings reaching out seventy-five miles. Each will be named after the major industry in which it is located.

Every detail for the comfort, convenience, entertainment and amusement of the visitors, at the lowest cost possible, is being given expert attention. The Exposition will run for 150 days and will be a place of charm and fascination to which people will want to return again and again.

MOTORING TO THE CONVENTION?

Complete Travel Service

If you are thinking of motoring to the Convention, write the Conoco Travel Bureau, Denver, Colorado, for free travel service. (Or fill in an Application card available at any Conoco Service Station.) They will send you a set of maps marked to show the shortest and best routes and the condition of the roads, illustrated literature descriptive of places of interest, lists of hotels and cottage camps, and a Conoco Passport.

* * * * *

A young man in a Ford rolled into a filling station and said, "One gallon, please." The attendant answered scornfully, "What are you trying to do, wean it?"

CONVENTION PAPERS

Phi Sigma Section at Atlantic City

UNDER the chairmanship of Dr. Paul B. Sears, of the University of Oklahoma, assisted by Dr. Paul A. Warren of Tufts College, National Chancellor and Vice-Chancellor of Phi Sigma respectively, the following papers were presented at the special session of Phi Sigma held in the Trellis Room of the Ritz-Carlton Hotel at Atlantic City, Wednesday morning and afternoon, Dec. 28, 1932.

* * * * *

1. Some biological effects of x-radiation of the red spotted newt,

Triturus viridescens.

BY PRESSLEY L. CRUMMY, *Alpha Epsilon*,
Zoological Laboratories, University of Pittsburgh

THE peculiar pigment migrations induced by ultra-violet radiations, as described by Collins and Wolf in 1930, led the writer to investigate the effects of x-radiation upon the pigment pattern of the same animal. According to these investigations, ultra-violet radiations caused the red pigment to migrate from its normal position to a more dorsal one. The disturbance of the black pigment was less drastic. It did, however, become rearranged to form characteristic black rings about the red pigment in its new environment.

The exposures to x-rays were made in two series. In series one, the entire bodies of the animals were exposed to heterogeneous beams of various dosages in an effort to find the dosage most effective in causing pigmentary disturbances. In series two, the bodies of the animals were protected by a quarter-inch lead plate, only a selected portion being exposed to the radiations.

In addition to pigmentary disturbances, several other effects have been discovered, while studying the results of the exposures made in series one. The red pigment seems to be the only one affected by x-rays. It is disintegrated and caused to migrate from its normal position, but in contrast to the migration caused by ultra-violet irradiation, this migration is more of a general scattering and gradual thinning out of the red spots. When newts were irradiated with a dosage of 7700 r

units, about twenty per cent of the irradiated animals apparently lost their red pigment entirely. The remaining eighty per cent showed a marked disintegration of this pigment. Slightly less severe treatments caused only insignificant pigmentary changes. A dosage of 1150 r produced no reaction. All of these dosages proved to be lethal. A dosage of 16,200 r killed the experimental animals before any pigmentary changes were observable. A dosage of 96 r proved to be non-lethal but, on the other hand, it did not cause any observable reactions in the pigmentary system.

The lethal action of the x-rays and the violent disturbances of the red pigment suggested that a histological study of certain organs might be of interest. Accordingly the integument and the intestine were studied rather carefully. These studies have shown that the epithelium of both organs is seriously affected. The mucosa of the intestine and the epidermis become completely disintegrated a few weeks after being irradiated by a strong dosage. The underlying tissues in both organs appear to have been less severely affected.

The experiments of series two were of an entirely different nature. In this series a standard dosage of 2000 r units has been used. Amputated tails which would, under normal conditions, have regenerated the amputated part within four months have been inhibited by irradiation. Two months after exposure the regenerated part was only one-half millimeter in length, whereas in the control group it was two millimeters. Studies on the effects of x-rays on the regeneration of paired appendages are now under way. It was found that certain dosages will produce morphological anomalies.

2. Some observations on the pigmentary system of the Urodele,

Triturus viridescens;

BY KENNETH L. KELLEY, *Alpha Epsilon*,
Zoological Laboratories, University of Pittsburgh.

Author's Abstract

THE vermilion spotted newt, *Triturus viridescens*, is commonly collected from fresh water ponds, lakes and streams. Although a lung-breather it is aquatic during its entire adult life. At this stage the dorsum has a rich olive-green color broken only by red spots surrounded

by rings of black. The ventrum is of a yellow hue dotted with many small melanic groups.

The pigments have been described as occurring in three types of cells, viz: melanophores containing black pigment granules, guanophores containing small crystals of guanin, and chromatophores containing the red and yellow elements. The green shade is caused by a combination of these components. The melanophores lying deepest give a bluish cast to the white guanin crystals which in turn causes the overlying yellow to appear olive-green.

Studies of adult forms mentioned above fail to complete the pigimentary picture. The pre-metamorphic larvae have been studied. These animals are similar to Harrison's No. 46 of *Amblystoma* tadpoles. In them the pattern of melanophores is already established and the yellow is discrete over the entire surface. The red spots appear quite suddenly just prior to metamorphosis. During metamorphosis the red spots are the only bright color on the nearly black animal.

Metamorphosis is followed by a rapid loss of melanic pigment with an increase in the yellow and red factors. The new land-living, air-breathing larvae have for a short time a brilliant yellow hue; this gradually adds reddish tints until the animals are a brilliant red-orange hue.

For approximately two years the post-metamorphic land forms darken very slowly and on entrance into adult aquatic life are much lighter than the older pond living animals.

Experiments with wounds and grafts on adult animals correlate the appearance of pigments in such areas with the embryological development of the same pigments.

3. Notes on some Permian plants in Western Pennsylvania and West Virginia;

BY WILLIAM C. DARRAH, *Alpha Epsilon*,
University of Pittsburgh Fellow in the Carnegie Museum.

THERE are among some 30,000 specimens of fossil plants turned up in recent collections in Western Pennsylvania and Northern West Virginia, a dozen plants of particular interest to the student of distribution in regards to both space and time.

The surface rocks in this region are of Upper Carboniferous or Pennsylvanian and Lower Permian age. No certain line of demarcation

can be drawn between them, for one grades gradually into the other. Continental European stratigraphers use certain index fossils, i. e. species with a limited vertical (time) distribution but with a wide horizontal (space) distribution, as determinants for Permian age. When a number of such index fossils are found together the age is thus arbitrarily determined. The purpose of this paper is not to enumerate the Permian plants found in Permian rocks, but to comment on several Permian plants from rocks of supposedly undoubted Carboniferous age.

Certain species of seed ferns belonging to *Odontopteris*, *Lesqueropteris*, and *Callipteris* and of the conifer *Walchia* are dependable index fossils. The first two are Permo-Carboniferous and the other two more strictly Permian, although a few pre-Permian records are known. In addition to these, a number of species of seed ferns or ferns belonging to the "genus" *Pecopteris* are likewise valid index fossils. The Carnegie Museum possesses specimens of all of these types collected in an area of Lower Permian and Upper Carboniferous deposition, but all of the specimens to which reference is made were collected in so-called Carboniferous strata. There can be but two possibilities—either the species can no longer be regarded as index fossils or the correlation of the rocks under discussion needs revision. The latter is more likely.

Of these types all except *Walchia* have been previously reported from this region, but this gymnospermous type is here recorded from the eastern United States for the first time. Much has been speculated to explain why *Walchia* could be absent from eastern North America and yet show up in south western United States. Doctor David White of the National Museum and the United States Geological Survey remarked more than once that additional collecting in the east would uncover specimens of this genus.

The Dunkard Permian Flora of western Pennsylvania, West Virginia, and eastern Ohio is not distinctly American in its makeup. It is essentially European and furthermore German rather than French. The floras of the Carboniferous and to a lesser extent of the Permian are of world-wide distribution over the northern hemisphere. They were studied in Europe first, so the European succession is regarded as the standard. Although a few Permian plants have been recorded from England, the Permian rocks are practically absent. The highest Paleozoic Flora of England is the Radstockian, a very distinct complex which has no exact equivalent on the mainland.

In Western Pennsylvania we find a flora which is practically identical with this Radstockian complex. It is of Upper Carboniferous age, but nevertheless contains some species definitely related to Permian species. Succeeding this local flora is a series of small floras successively simulating a Permian appearance. The upper beds of this series are strangely similar to a Permo-Carboniferous Flora of Shansi, China, but at the same time containing definite French elements.

There are grounds for a growing suspicion that the floral succession of Upper Carboniferous and Lower Permian age in eastern United States, will, when reasonably complete, represent a New-World standard with which other floras can be compared with the Old-World succession. The records of Permian plants here cited are essentially out of place and time, but lend considerable support to this tentative suggestion.

4. Some Problems of Regeneration

BY EUGENE CUTULY, *Alpha Epsilon*,
Zoological Laboratories, University of Pittsburgh.

TAILS of adult *Triturus viridescens* were cut midway between the tip of the tail and the most caudal point of the cloaca and allowed to regenerate for periods of from one to seven days. At intervals of 24 hours the tails were amputated some distance cranial of the cut, so as to include the normal tissues, and the excised portions were fixed with Zenker's fluid. Serial sections of the pieces were cut longitudinally or parasagittally at 10-12 micra, stained with Mallory's triple stain, and mounted in gum damar.

The first true phase of regeneration is found to be the covering of the wound with epidermal cells. In much less than a day after the tail has been cut, cells from surrounding normal epidermis migrate over the wound area. In less than two days it is completely covered. The cells which form this primary covering then increase further by mitotic division to restore the normal number of layers.

Soon after the wound has become covered with epidermal cells there appear immediately beneath the latter small, indifferent cells. These are the so-called blastema cells. They can be observed definitely after regeneration has progressed for two days, but it is quite probable that they arise much earlier. The origin of these cells is uncertain. In later stages, however, (six or seven days after operation) it is possible

to determine the specific source of blastema cells which are then forming. The process is one of dedifferentiation of differentiated structured with subsequent redifferentiation. Unbroken connections between normal connective tissue and the mesenchymatous type of tissue to which it gives rise leave no doubt that the latter is an indifferent tissue formed from connective tissue. The indifferent tissues are made up of the blastema or formative cells, which arise from cells of the connective tissue. The blastema cells soon produce processes which interlace to form a mesenchymatous matrix which is usually found at points where, if the tissues were normal, the germinal layer of the epidermis and the dermis are in union. This matrix, because of the spaces present in it, appears fenestrated, similar to embryonic connective tissue. The spaces often contain blood cells and represent, probably, the first stages in the re-establishment of vascularization. Studies to trace further the differentiation of blastema cells are now under way.

Concomitant with the formation of blastematos structures there occurs a number of processes which may be considered degenerative. Cartilage is seen to undergo a process of degeneration which continues for three days, after which it apparently becomes inactive. Fibers near the cut end of the nerve cord also degenerate, giving the impression that the latter is retracting from the wound area. No progressive signs of regeneration of these two types of tissues were observed.

A third type of tissue which undergoes degenerative changes is muscle. The result of these processes is the dedifferentiation of the spindle shaped muscle cells with oval nuclei into rounded cells with centrally located nuclei. These latter, known as sarcoplasts, may be considered as representing an indifferent stage in muscular regeneration. In this indifferent state they wander into the regenerative area where later, it is known, they redifferentiate to produce typical muscle fibers.

5. Sexual Differentiation in the Tail Length of the Lined Snake

Tropidoclonion lineatum (Hallowell)*

BY ETHEL R. FORCE AND NORMAN L. SCHMERCHER, *Alpha Delta*,
University of Michigan Biological Station.

A FAIRLY large series of specimens of the lined snake, *Tropidoclonion lineatum* (Hallowell) provided the opportunity to test the amount of

sexual differentiation in the relative length of the tail. Four hundred eleven lined snakes from Tulsa County, Oklahoma and vicinity were measured for total length and tail length, and the sex was determined in each case by dissection. Only specimens with complete tails were used. Then the relation of the tail length to the total length was computed in percent.

The data obtained are summarized in accordance with the scheme used by Burt for *Thamnophis s. sirtalis* (Copeia, No. 116, pp. 13-14). The proportionate length of the tail in the whole series varied from 7.5% to 26.6% of the total length. The interesting point is that the great majority of specimens, about 79%, may be sexed on this basis alone. Specimens with a tail less than 14.5% of the total length proved to be females; those with tails more than 16.5% were males. Only about one fifth of the total series (21.41%) could not be sexed on this basis (see accompanying table).

A review of the study of the common garter snakes indicates a range of 44% in which the proportionate length of the tail may be used in determination of the sex, whereas in the lined snakes it is true for 79% of the cases.

Appreciative acknowledgement is made of the criticism of the manuscript by Dr. F. N. Blanchard of the University of Michigan.

August 20, 1932.

Table showing proportionate length of the tail in the lined snake, *Tropidoclonion lineatum* (Hallowell)

	Percentage of tail to total length	Males	Females	Both Sexes	Percent of total number
Group I	6.5— 7.5	None	1	1	49.64%
	7.6— 8.5	None	2	2	
	8.6— 9.5	None	0	0	
	9.6—10.5	None	2	2	
	10.6—11.5	None	6	6	
	11.6—12.5	None	37	37	
	12.6—13.5	None	69	69	
	13.6—14.5	None	87	87	
Group II	14.6—15.5	17	22	39	21.41%
	15.6—16.5	38	11	49	

	Percentage of tail to total length	Males	Females	Both Sexes	Percent of total number
	16.6—17.5	68	None	68	
	17.6—18.5	26	None	26	
	18.6—19.5	8	None	8	
	19.6—20.5	5	None	5	
Group	20.6—21.5	3	None	3	28.95%
III	21.6—22.5	4	None	4	
	22.6—23.5	1	None	1	
	23.6—24.5	0	None	0	
	24.6—25.5	2	None	2	
	25.6—26.5	1	None	1	
	26.6—27.5	1	None	1	
Total		174	237	411	100%

6. A Study of Bat Movements

BY CHARLES E. MOHR, *Alpha Iota*,
Reading Public Museum.

THE study of bird movements by marking individuals with metal leg bands is well established. The wealth of data which has been gathered over a period of years shows conclusively that birds possess a homing instinct.

The study of bat movements on the other hand, has progressed no farther than a recognition through casual observations, that certain tree-dwelling species are migratory.

The observation of marked sexual segregation and seasonal fluctuation among bats during the writer's study of cave fauna for the Pennsylvania Topographic and Geologic Survey, as well as during visits to caves in Tennessee, Kentucky, and Indiana, suggested the need for a study of the individuals' movements.

After a period of experimentation with staining, stenciling, and tattooing methods, the writer procured small metal leg bands, smaller than those used for the smallest birds. This proved to be the first satisfactory method for marking individual bats. Difficulty in attaching the bands and the impossibility of detecting them on hibernating bats

prompted the trial of metal tags such as have been used on the fins of small fishes, and which are known as "fingerling" tags. These were attached to the ears of the bats and proved entirely satisfactory.

During the summer of 1932 more than a hundred bats were caught at a cave about 16 miles from Reading, by stretching a net across the constricted passageway just inside the entrance. The bats flew against the net while attempting to enter the cave in the evening and during almost the whole night.

Three species were tagged, the little brown bat, *Myotis lucifugus lucifugus*, the pipistrelle, *Pipistrellus subflavus subflavus*, and Trouessart's bat, *Myotis keenii septentrionalis*. Several dozen of the marked bats were released at the Reading Museum, 16 miles away. The first of the tagged bats, little brown, were recovered on the net at the cave a week later. In all about half a dozen marked bats returned to the cave, little brown bats and pipistrelles making the flight.

A more satisfactory experiment was carried on with a breeding colony of little brown bats discovered in a frame house 30 miles from Reading. These bats were caught by stretching gill netting over the sides of the house. The bats flew into the net as they attempted to leave their roosting places, at dusk.

On June 17, nearly 300 of these bats, pregnant females, were removed to a deserted house about 17 miles nearer Reading. This was considered to be an ideal roosting place for them. Approximately 25 bats were tagged and released at distances of 1.3, 2.8, 5.8, 12.5, as well as about 15 at the Reading Museum, 30 miles away.

By July 18 we had recovered, at the original breeding colony, three bats that had returned 30 miles, three, 17.5 miles; three, 12.5; and the single individuals that had been released at 2.8, and 1.3 miles. In addition practically the whole group of unmarked bats, about 200, apparently returned 17.5 miles.

The tagging of several colonies of young bats, during the summer, may eventually furnish data on the longevity of bats.

A wider field of research was opened in October when a small series of bats, *Myotis sodalis*, sent to Reading from Nickajack Cave, near Chattanooga, Tennessee, were tagged and released. While these bats may never be found, the writer does not doubt that the tagging of large series will show that even some cave-dwelling species migrate for long distances and possess a highly developed homing instinct, as indicated by the experiments just reported upon.

Other related topics suggested for study by the use of tags are an analysis of the movements of individual bats during hibernation, and an investigation into the sexual segregation of bats, a condition particularly marked at certain periods of the year.

7. Occurrence of European Hydromedusa on the Maine Coast;

BY EMILY THOMPSON, *Delta*,
University of Maine.

ON July 2, 1932, a small medusa was found off the pier of the University of Maine Marine Station at Lamoine. This was subsequently identified as *Melicertum octocostatum* Haeckel, fitting in every detail the description given in Mayer's "Medusae of the World." The characteristic rows of nematocysts between the radiating canals were particularly clearly seen and there is no doubt as to its identification. As this is the first record of this species on the American coast in so far as we can ascertain, it seems worthy of note. That this form was not present during the summer of 1931, at least in any abundance, is quite certain for if it had been it most certainly would have turned up in the collecting done by the class in Invertebrate Zoology at the University of Maine Marine Station. It was found up to about the 10th of August, although not in any abundance after the first. This form could be collected best at about sunset or sunrise and was particularly abundant if *Cyanea capillata* was present, as it had the habit of feeding on the tentacles of this species. It was found occasionally attached with the end of a tentacle in the oral cavity, but most frequently merely in association with the *Cyanea* with its gastric cavity and radiating canals filled with the characteristic pigment from *Cyanea*. How this form may have reached this region is problematic, but a study of its distribution, if it is found this next summer, may at least give some information about the rapidity with which it can become distributed within a new area. This note is made hoping that it will cause observers all along the North Atlantic coast to watch for this form during the summer of 1933.

Melicertum octocostatum Haeckel is reported as having been found in Frenchman's Bay. This has been recorded previously from the European coast only and apparently is a new form to this region. Dur-

ing the summer of 1932 between July 1 and August 1 it was quite numerous, being found on the eastern shore of Mt. Desert from Hadley Point to Northeast Harbor.

8. The Spider Fauna of the Raft River Mountains, Utah

BY RALPH V. CHAMBERLIN, AND WILTON IVIE, *Alpha Lambda*,
University of Utah.

IN connection with a University of Utah expedition to the Raft River Mountains of Utah in search for Pleiocene fossils, the authors did considerable collecting for spiders. The trip was taken the first part of September of this year, and altho the collecting covered a period of only six days, the results were very satisfactory, and indicate that this region is now one of the most thoroly collected areas in the west for spiders.

The Raft River Mountains are situated in the extreme northwest corner of the state, and are located in a typically western desert region. The higher peaks are covered with coniferous trees, and give rise to a few small streams, the more important of which drain into the Raft River of southern Idaho. The lower parts of the mountains are covered with sagebrush and associated flora.

The collecting along the streams consisted of sifting leaves, searching under logs and bark of dead trees, and amongst moss and grass; on the hillsides, it consisted in sweeping the brush and other plants, and in looking under rocks, etc. The collecting was necessarily hurried and insufficient in many places, consequently many species were undoubtedly missed, while many others were represented by only a few specimens. Also, at this time of year many species are found only in the immature stages.

The collection contained one hundred and thirty-five species, representing fifteen families and about eighty genera. Four of the families are represented by only one genus and one species each; the other families, except for the Linyphiidae, range from two to seven genera, and from two to thirteen species each. The Linyphiidae was by far the largest family collected, being represented by twenty-one genera and forty species. From collections made in this area and from other parts of the west, it is safe to predict that the Linyphiidae will soon

succeed the Salticidae as being the largest family of spiders in the United States.

Eight genera and twenty-one species are at present regarded as new. However, since some of the spiders require further study, these numbers may be slightly altered by the time this report is ready for publication. Many of the species are new to the state, some being previously known only from New England and Canada.

This collection, supplemented by others from elsewhere, show plainly that many species, which have been regarded as typically New England spiders, have a very wide distribution, being found all the way across Canada and extending south into the western states along the mountain ranges.

Altho the Raft River Mountains are isolated in a barren corner of the state, their spider fauna represents about one-fourth of the spiders to be found in the State of Utah; and suggests the rich possibilities to be encountered in other regions of the west where collectors have never been.

9. The Bird Rookeries of the Islands of Great Salt Lake

BY WILLIAM H. BEHLE, *Alpha Lambda Chapter*,
University of Utah.

AN investigation during the spring and early summer of 1932 revealed that there were four bird rookeries on the islands of Great Salt Lake. The most widely known of these breeding areas is located on Hat Island which is also locally called Bird Island. It was estimated that 4000 American White Pelicans, *Pelecanus erythrorhynchos*, 20,000 California Gulls, *Larus californicus*, and 15 pairs of the Treganza Blue Heron, *Ardea herodias treganzai*, nested on the island.

The largest rookery was located at Gunnison Island. An actual nest count indicated that there were 6,600 White Pelicans and 16 pairs of the Treganza Blue Heron breeding there and a California Gull population of over 60,000.

Egg Island, which is the type locality for the Treganza Blue Heron, supported a breeding population of 17 pairs of herons, 1200 California Gulls and 48 pairs of the Double-crested Cormorant, *Phalacrocorax auritus auritus*.

The fourth rookery located on White Rock was composed exclusively of California Gulls to the number of 500.

There were then breeding on the islands of Great Salt Lake in 1932 some 80,000 gulls, 10,600 pelicans, 96 herons and 96 cormorants. These four species were the only birds found nesting on the islands of the lake.

In 1929 seventy-five pairs of cormorants were reported to be nesting on Dolphin Island but this location was not utilized in 1932 nor was any evidence found to indicate that it had been used for years.

A review of previous records shows that the Double-crested cormorants have decreased alarmingly in numbers from over 500 on Egg Island in 1915 to only 96 in 1932 and from 150 on Dolphin Island in 1929 to none this past year. The Treganza Blue Herons have been reduced from 400 on Hat Island alone in 1915 to 96 on all the islands in 1932. If these trends continue, the extermination of these birds in this locality is threatened. The gulls have apparently maintained their numbers throughout the years on Hat Island although the several estimates for various years have ranged from 8,000 to 20,000. The number of pelicans has generally been given as 2,000. They are probably increasing. There does not seem to be any records for Gunnison Island.

The birds are afforded excellent protection from predatory animals by the salt water surrounding the islands. An abundance of food supply is available in the fields, sloughs, rivers and fresh water lakes within a hundred miles of the islands. Analysis of stomach contents and regurgitated piles of food indicates that the pelicans and cormorants in this region utilize the sluggish, slow moving fish such as carp and suckers rather than trout and other game fish. These birds are therefore worthy of full protection.

10. The Control of Yellow Hawkweed

By R. G. BISSEY, *Alpha Epsilon*,
New Hampshire Agr'l Exp. Station.

EXPERIMENTS during the past season indicate that yellow hawkweed may be controlled by the use of chemicals. Applications made at flowering time or before were more effective than later treatments. Sodium chlorate, applied as a spray in May or June at the rate of 100 pounds or more to the acre, killed 90 to 100 percent of the weeds, but the

treatments sterilized the soil so thoroughly that no new vegetation appeared on the plots during the season. Similar applications of ammonium thiocyanate were equally toxic, and instead of being detrimental to subsequent vegetation, seemed to act as a fertilizer and stimulated the growth of unharmed thistles and hawkweed on, and at the edge of the plots. Kainit, broadcasted as a dry salt to wet foliage at the rate of 1000 pounds to the acre, gave 80 to 90 percent control. This promises to be a satisfactory chemical to use also, since it is a fertilizer as well as, an herbicide.

* * * * *

The following papers were read only by title:

11. A New Nematode of the Genus *Wellcomeis* or *Oxyuris*, by Edward Dorland, Alpha Lambda, University of Utah.
12. Studies on the Pliocene Molluscs of Utah, by R. V. Chamberlain and E. G. Berry, Alpha Lambda, University of Utah.
13. Pollen and Allergy, a moving picture, by Ray M. Balyeat, Omega, University of Oklahoma.

STILL WANTED

The National Secretary's office is very desirous of obtaining copies of certain back numbers of the *Biologist* which are needed to complete sets to be bound. Look through your chapter files and see if you have any numbers listed below. If anyone in your chapter has any of the following list, please send them in (postage will be refunded)—your co-operation will be greatly appreciated.

The list of numbers needed follows:

Vol.	No.	Vol.	No.
May, 1916.....I	1	April 1925 ...VII	1
Feb., 1921....III	1	May, 1926 ..VIII	1
Dec., 1921....III	3	April, 1928X	1
May, 1923.....V	1	April, 1929X	3
Dec., 1923.....V	2	Sept., 1929 ...XI	1
May, 1924....VI	1	Feb., 1930XI	3

The New Heraldry

THERE is something peculiarly fascinating about the study of heraldry. The very vocabulary of the art is romantic—the “lion rampant upon a field gules,” for instance. Nor was it without its use as well as its dignity. A coat of arms furnished ideals, gave a man or a family something to live up to.

Why should it not be revived in the scientific modern world? There might be a College of Heralds to determine under what circumstances a scholar was entitled to the honor of a hallmark. We might begin with the starred men in *American Men of Science*. Once admitted to the College, a scientist might be considered to have arrived, to be of the blood, if one may employ such language without offense. Ph.D.'s are becoming so common, you know.

The suggestion was born of the desire to find something symbolic with which to ornament Austin H. Clark's new book, *The New Evolution*. It chanced that Dr. Clark is the authority on Crinoidea; and the sea-lily lends itself beautifully to conventional decorative design. So the new book will be hallmarked with a design representative of the author. Why should not the same design be used on every book Dr. Clark publishes hereafter? Thus the sea-lily would come to mean “Clark” wherever it appeared, decoratively.

So, Raymond Pearl might use a conventionalized asymptotic curve or a carefully balanced monogram of the Pearl index. Paul Popenoe could be represented by a skilfully patterned human germ-cell; George Sarton by an image of Isis; Paul R. Heyl by an appropriate crystal; Ales Hrdlicka by a human skull, thus rescuing that exceedingly useful item in the anatomy from its disagreeable association with Captain Kidd; and so forward.

This idea is offered to the next meeting of the Washington Academy of Sciences, or the A. A. A. S., certainly not in any flippant mood. The notion has real merit.

GROVER C. ORTH,
in “*The Kalends*.”

EDITORIALS

THE WORLD AT OUR DOOR

THE biennial convention of Phi Sigma comes at a time and a place which should give it a distinctive flavor and an attractive zest peculiarly its own. In many ways, the forthcoming convention will be one that will go down in our history as long to be remembered. The conventions of the more recent past have been characterized by two main features: Scientific papers by the members of the Fraternity, and the deliberative sessions of the national officers and the chapter delegates. The sessions have always occurred in connection with the meetings of the various component societies of the American Association for the Advancement of Science. They have thus given us all opportunities to see the great men of the modern scientific world, and to hear them report in person on their own research. However, not the least interesting part of the meetings by far, was the display of commercial exhibits of the various scientific supply houses which always accompanied each meeting. Uniformly, these exhibits have been stimulatingly suggestive and educationally helpful.

If it were possible for one to imagine an enormously glorified exhibit of practically all the major products of the world's scientific research and manufactures,—what an incomputable educational and stimulative value it would have? It would fill the mind with new ideas, broaden the intellectual horizon as only travel in foreign lands can do, and stimulate to new and higher efforts for self development. If one were to add to this the cultural and esthetic advantages of one of the world's greatest centers of population, what mind-staggering possibilities are set forth.

Does the 1933 Convention of Phi Sigma offer anything less?

It will be held immediately after the sessions of the American Association for the Advancement of Science. Its headquarters at the Stevens Hotel are identical with those of the Botanical and Zoological societies there in session, and look down across Michigan Avenue on the north end of the Century of Progress Exposition Grounds. This convention will bring together the delegates from our far-flung chapters in every part of the United States to deliberate on affairs for the general good of the Society. Our usual program of scientific papers by our members will be presented as in the past.

And before, and through, and following it all, will be the matchless opportunity to enjoy the exposition proper with all the features which are elsewhere explained in this magazine. Then too, there is the opportunity to dig deeply into the truly fabulous storehouses of art, and history, and natural science in the Chicago Art Gallery, the Field Museum, the Adler Planetarium, the Shedd Aquarium, and the Rosenwald Museum of Applied Arts. To all of this one might add the opportunity to tread the classic quadrangles of famed Chicago University, or to visit the busy downtown campuses of an Illinois, a Loyola, a De Paul, a Northwestern University! Add the possibilities of wholesome recreation or profitable enjoyment in the pounding breakers of Lake Michigan, one of the world's greatest inland, fresh-water seas. Further attractions will be found at the lectures, the concerts and the theaters which Chicago so plentifully offers.

So we might go on, knowing a little of what is in store. But what is the use? It is another "World's Fair," a far greater "Columbian Exposition," it is,—in a word,—A Century of Progress, made visible, made tangible, and gathered here in one brimming cup for us to grasp, and quaff it as we may. Shall we neglect this opportunity, no matter what it costs?

ALPHA DELTA SHOWS A WAY

THE National Council takes this opportunity to congratulate the Lawrence College Chapter of Phi Sigma which has shown a commendable foresight in planning a financial prize to be offered in the future for the best Junior or Senior paper presented. While there is nothing distinctively novel in the idea,—it has been used before in other chapters,—this is a sort of chapter activity which should be more often heard of. After all, the stimulation of effective interest in biological research is the main purpose of Phi Sigma,—and there are so many ways of doing this now in use among the Chapters. None, however, in the long run, are likely to be as effective stimuli as the idea of prize money.

Of course, it is all very well to be unselfish, and noble, and superior,—and to say that it isn't always necessary to offer prizes. True! Nobody denies it. Just the same, we have an Editorial suspicion that there will be considerable strenuous work of a high calibre done in biological fields on the campus of one of Wisconsin's fine old small

colleges in the next few years. And it might not have been done were it not for the stimulus of this prize money.

ANOTHER CONVENTION?

WHEN is an editorial not an editorial? When it is insincere or untruthful? Your Editor has attended every National Convention of Phi Sigma. He has grown up from a cub member of Zeta at Wisconsin, through Chapter Secretary, Chapter President, Zeta's delegate to the first National Convention, four years as National Vice-Chancellor to the Editorship. If this experience means anything then the following observations should have the merit at least of being sincere and truthful. That they corroborate, and in a large measure, repeat, the advice of the National Secretary in the opening pages of this issue only goes to show that two people of widely different types, interests, fields of labor and the like, who labor long enough at the same task, are likely to reach the same conclusion, no matter what their previous ideas may have been.

No one will argue the point that the times have been out of joint,—least of all, anyone who has been connected with the multifarious phases of getting, or giving, an education. That this year's Phi Sigma Convention *may*, therefore, find itself confronted with many and new problems will not be surprising. There is hardly a Chapter that has not been forced to undergo some metamorphosis during "this winter of our discontent." If the organs have been so affected it would be poor biology indeed not to expect some proportional effects on the organism itself. It does not need the fabled prophetic instinct of a seventh son of a seventh son to predict the possibility of some such situation when the Chapters foregather in June.

To your Editor there seems to be but one real question which should agitate the mind of every Phi Sigma member and the delegate his chapter sends to the National Convention. It is this: "Are abnormal times, and abnormal circumstances, sufficient justification for more than the most temporary of legislative action?" In other words, should we not this year, of all years, be most cautious in adopting only the most obviously essential lines of action?

From all of this it seems logically to follow that each active Chapter should choose its most prudent and level-headed member as a delegate,

and then leave to his or her good judgment the decision how to vote on the questions which may come up. It is your Editor's candid opinion that more fraternity conventions, (and political ones, too,) have been ruined by the so called "instructed delegates" than anything else. No matter how much it may satisfy those who stay at home, it is hardly flattering to the common sense or intelligence of a chapter brother or sister, when they are sent to a National Convention muzzled!

BIRDS AND THE WEATHER

When birds of long flight hang about home, expect a storm.

When birds cease to sing, rain and thunder will probably occur.

Birds and fowls oiling feathers indicate rain.

If fowls roll in the dust and sand, rain is at hand.

"If the cock goes crowing to bed,

He'll certainly rise with a watery head."

When chimney-swallows fly high and chirp, fair weather follows;
when low, rain follows.

When the cuckoo is heard in low lands, it indicates rain; when on high lands, fair weather.

Cranes soaring aloft and quietly in the air foreshow fair weather; but if they make much noise, as if consulting which way to go, they foreshadow a storm that's near at hand.

"If the wild geese gang out to sea,

Good weather there will surely be."

Martins fly low before and during rainy weather.

Loud and long singing of robins denotes rain.

If crows make much noise and fly round and round, expect rain.

"When the peacock loudly bawls,

Soon we'll have both rain and squalls."

Clamorous as a peacock against rain.—Shakespeare.

"THE KALENDS."

DID YOU KNOW THAT . . .

Delta

D. S. Welch, '17, discovered one of the ten little known plant diseases, discussed in a meeting last December, under the auspices of the pathologists, assembled at the Atlantic meeting. The disease, "A Nectoria Canker of Basswood."

A noteworthy contribution at the session of the Genetics Society of America, was that of Dr. John W. Gowen, '24, and Elizabeth H. Gay, on "Gene Number, Kind and Size in *Drosophila*."

M. A. Chrysler, '17, read the opening paper in the December 29th meeting of the Botanical sciences and associated societies. His subject was, "The Vegetation of the New Jersey Pine Barrens."

Donald Folsom, '26, discussed "A Tuber Rot of Potatoes caused by *Botrytes cinerea*," before the American Phytopathological Society.

Zeta

Professor H. I. Jackson, '26, of the department of Botany of the University of Toronto, gave the Annual Darwin anniversary address under the auspices of the Botanical Seminar of Michigan State College on February 14.

E. E. Wilson, '24, plant pathologist, discovered "Bacterial Cankers of *Pinus* in California."

Professor G. S. Avery, Jr., '26, described marked increase in size of all fundamental tissue cells caused by the "topping" of tobacco. The report was made before the Botanical Society of America at the annual meeting in Atlantic City.

Lambda

At the ninth annual meeting of the Northwest Scientific Association, held at Spokane, Dr. R. R. Parker, '22, delivered an address on the subject "Tick Borne Diseases of the Rocky Mountain Region." (SCIENCE, FEBRUARY 17, 1933)

Mu

Professor D. R. Hoagland, '16, President of the American Society of Plant Physiologists, spoke on "Plant Physiology Problems," at the ninth annual meeting, December 30, 1932. He also collaborated with T. C.

Broyer, '31, on a paper read before this meeting. The report "showed that accumulation of diffusable ions within a plant tissue is dependent upon the carbohydrates and oxygen supply of the tissue and has the temperature coefficient of a chemical reaction."

Nu

Professor O. E. Jennings, '22, concluded the symposium of the Botanical Society of America, December 20, 1932, with his paper, entitled "Cryptogams and Field Work."

XI

Dr. J. E. Achert, Dean of the division of graduate study and professor of Zoology and parasitologist at Kansas State College, Manhattan, addressed the Snow Zoological Club at the University of Kansas on February 21, on "Host-Parasite Relationships between Chickens and their Intestinal Nematodes."

Tau

John Dorlich, '29, discovered *Nectria corcinea* on beech. This was reported December 28, 1932, at the annual dinner of the Pathologists, held in Atlantic City.

Upsilon

P. J. Kramer, '26, contributed an interesting paper at the session of the Plant Pathologists, last December. The topic was, "a passive role in water absorption has been assigned to the roots of plants."

Chi

W. H. Thorp, '27, at the Session of the Physiological Section of the Botanical Society last December, stated it was possible to produce more permeable seedcoats of barley by growing the plants in moist cages.

Psi

Dr. W. F. Thompson, '31, discussed "A Deep Sea Fisher," at the annual meeting of the Northwest Scientific association, in Spokane, Washington, on December 29, 1932.

Omega

Anton J. Carlson, '30, professor of physiology at the University of Chicago, gave the first Herbert Swift Carter memorial lecture on December 12, at the School of Medicine of Columbia University.

MEDICAL SCIENCE IN ITS SACRIFICES FOR HUMANITY

Hard-won Victories of the Last Century to go on Display when 1933 Fair Opens

By EBEN J. CAREY, D. Sc., M. D.

THE international exposition to be held in Chicago June 1 to November 1, 1933, will furnish an ideal setting for the impressive display of exhibits depicting A Century of Progress in the Medical Sciences.

The development of the Medical Sciences paved the way to our present knowledge regarding the facts and laws of the conservation of health and prevention of disease.

The body of the displays will be different from former exposition exhibits. Where endless miles of products were once exhibited, A Century of Progress exposition will display processes. To tell the story of human advancement since 1833, to tell the story in action when this can be done, but in every case to tell the story so that every one can understand clearly how the world of a century ago has been changed into our amazing world of today—that is the theme.

Sacrifices for Humanity

The exposition itself will be much like a vast motion pictured drama. The plot is the story of Science and Industry and Art. The scenario includes the portrayal of sacrifice and heroism and devotion endured by men and women of science in behalf of humanity. Hard-won victories and triumphs of science and industry and art have never before been made the center of an international celebration. The celebration of 1933 must be appealing to all professions, most of all perhaps to the medical profession.

The medical arts grew out of sympathy for human beings who suffered. Compassion, and not commercialism, drove men to do their utmost to discover the causes of diseases, to find out surer methods of diagnosis, and to set forward favorable health conditions for every one. Any one who knows any doctor of the real type intimately knows that the passion which put a man into this profession and kept him there

was far removed from greed and covetousness—it was almost pure humanitarianism in most instances.

One of the most distinguished members of the profession has frequently repeated the statement that greater advances in scientific knowledge and consequent professional skill have been made since the beginning of this century than all former centuries of human experience had seen. If such a statement is justified it is even more justifiable to say that the sciences and arts of safeguarding human health have made their greatest advance in the past century of progress.

Exhibits Strike New Note

The exhibits of medical sciences at A Century of Progress will visualize, simply yet dramatically, the tremendous strides made during the past century in the causes, detection, treatment and prevention of human and animal diseases. Each display will be so planned as to be interesting and educational, not alone to the physician and medical scientists, but to the laymen as well.

In order to facilitate this great task, which never before has been attempted by an international exposition, the exhibits have been classed into four general groups as follows:

1. Historical exhibits, illustrating the great discoveries and achievements which have revolutionized the medical sciences in the past 100 years.
2. Collective educational exhibits, depicting the present condition of the medical sciences.
3. Exhibits which will have an appeal because of their spectacular character.
4. Collective industrial exhibits.

By collective exhibit is meant one put on cooperatively by a group of scientific institutions, producers, manufacturers and distributors within an industry. Yet, individualism will be maintained. Each exhibit will be a show by itself, but all of the exhibits in a group will coordinate and cooperate as a whole in accordance with the general plan of exhibits. This has secured the approval of all the exhibitors who thus far have signed up for display space.

The medical scientific institutions of the world that have been related to historic and scientific advancements of an epoch-making nature, have responded in a gratifying manner by undertaking the preparation and installation of exhibits. The Pasteur institute of Paris, directed

by Dr. Roux, and the Robert Koch institute of Berlin, directed by Professor Neufeld, will have exhibits of fundamental historical and scientific importance in medicine.

Everyone who has passed through the west entrance of the Field Museum in Chicago has had an opportunity to read on the statue of Pasteur, the fundamental contributions that he has made in bacteriology that have resulted in benefits to mankind. Just fifty years ago, in 1882, Robert Koch made his discovery of the tubercle bacillus, the cause of tuberculosis. The suppression of the white plague was dependent upon the knowledge of its cause.

The Deutches Hygiene museum of Dresden, directed by Dr. Seirring, will have dynamic exhibits of human physiology and constitution.

Working the Dynamic Models

It is planned that visitors to the exposition may participate in experiments of human anatomy and physiology through the medium of the dynamic models.

There will be no "Hands Off" signs on any of the exhibits of anatomical action.

The visitor may be invited to operate the levers and electrical buttons, so that by close study of these dynamic models a knowledge of the mechanism of the major systems of the human body may be obtained in an educational manner that will be of advantage to the individual and will serve as a basis of knowledge in the conservation of health.

Primitive American 'Medicine'

The Wellcome Museum of Medical Science of London, founded by Sir Henry Wellcome, will have an exhibit telling the story of a century of progress of British medicine and surgery. The Liverpool School of Tropical Medicine, directed by Dr. Warrington Yorke, will have an exhibit on the cause, means of animal transmission, treatment and prevention of tropical diseases. The aeroplane, as a means of travel, has transported many tropical diseases to the United States. These diseases are not so remote, therefore, as they formerly were and have become of interest to the layman of the temperate zone.

In the Middle West at the time of the Dearborn massacre in 1812 and about the time of 1833, the Indians had a primitive medicine and a medicine man. The Milwaukee Public Museum, one of the largest municipal museums of the United States, directed by Dr. S. A. Barrett,

is preparing an exhibit on "Primitive Medicine." A typical ceremonial scene will be shown by a life size diorama.

Many of the herbs used by the American Indian became invaluable drugs for the white man, namely, quinine, cascara sagrada and others. Indian medicines, amulets and charms will be vividly displayed in this attractive exhibit, and will be transported to Milwaukee as a permanent exhibit in the Milwaukee Public Museum after A Century of Progress exposition terminates.

Great Progress in Medicine

From 1828 to 1833, Dr. William Beaumont carried on his epoch-making observations on the digestion in the stomach at the Indian outposts in Michigan and Wisconsin. Most of the experiments were carried on at old Fort Crawford, Prairie du Chien, Wis., on the Mississippi river. A collective exhibit by Washington University of St. Louis and the University of Wisconsin will portray this work of the first American physiologist who marked the transition between the primitive medicine of the Indian and the medical scientist of the present day.

The Harvard University School of Medicine and the Massachusetts General Hospital are identified with epoch-making advances in medicine that will be told by exhibits illustrating the following: (1) Warren and Morton first published their work on the use of ether in a major surgical operation in 1846. (2) Oliver Wendell Holmes, the anatomist and poet, first advocated cleanliness on the part of the doctor in child birth, in order to eradicate child bed fever. (3) The first appendix was removed at the Massachusetts General Hospital. (4) The Minot and Murphy liver diet treatment of pernicious anemia practically eliminated this devastating disease from the list of deadly diseases.

Dr. Long of Georgia first used ether in 1842. One of Dr. Long's last patients is the present dean of the University of Georgia School of Medicine, Dr. Moss. Dr. Long did not publish his work until after Drs. Morton and Warren had published their work on ether. The state of Georgia recently placed a statue of Dr. Long in the Hall of Fame in Washington, D. C., commemorating his first use of ether. Since Dr. Long is a graduate of the University of Pennsylvania, a collective exhibit on the history and ether contribution of Dr. Long will be prepared by the University of Pennsylvania and the University of Georgia. These exhibits on ether anesthesia, a fundamental contribution by American physicians and dentists, are among the most important

and interesting advances in the medical sciences. This "History of the Control of Pain" has always interested the layman.

The American College of Surgeons will tell the story of the pasteurization of surgery by Lord Lister in 1867 after the Civil War. This progress was advanced by American surgeons and the simple theme throughout the ritual of a surgical operation will be exposed as the practical application of the age-old adage "Cleanliness is next to Godliness." The work of the American College of Surgeons in the standardization of hospitals and the registry of malignancy will be evident to the physician and layman.

The American College of Physicians will tell the story of what is behind the physician when he attempts to diagnose the disease state of the human body. The history of physical diagnosis is a fascinating one. The use of the stethoscope by Laennec in order to detect normal and abnormal sounds in the heart and lungs is of definite importance. The laying on of hands and thumping the chest in order to determine the physical state of deep lying organs are comparatively recent acquisitions of the physician contributed by Auenbrugger. The use of refined instruments in the detection of disease will be shown by exhibits.

Since Sir William Osler was a graduate of McGill University of Montreal, Canada, the historical exhibit of Dr. Osler has been assigned to McGill University. This is of interest to the layman as well as the physician.

HONORS - GRANTS - ELECTIONS AND APPOINTMENTS

Beta

Professor Paul S. Welch, '23, was a member of the committee representing the Zoological Sciences at the Atlantic City meeting.

At the meeting of the American Society of Parasitologists, last December, the retiring Secretary-Treasurer, Dr. Norman R. Stoll, '17, was given a vote of appreciation for his services to this society. He was, however, at this same meeting appointed to the chair of a council member for a period of four years.

Delta

W. W. Martin, '25, was elected vice president of the newly organized Mysological Society of America.

Zeta

E. J. Kraus, '21, of the University of Chicago, was elected president of the Botanical Society of America for 1933.

Professor L. E. Nolan, '20, will serve for three years as a member of the executive committee of the American Microscopical Society.

Dr. E. E. Hubert, '21, was appointed a councilor of the Northwest Scientific Association.

H. S. Jackson, '26, professor in Botany at the University of Toronto, was elected to the office of councilor of the Mycological Society.

Iota

E. F. Cowday, '28, was elected vice-president of the American Society of Naturalists for the year 1933.

Lambda

At the fifty-first annual meeting of the Microscopical Society, M. J. Elrod, '21, was elected president for 1933.

Mu

W. B. Herms, '23, was elected national vice-president of the Entomological Society of America.

Xi

Dr. R. J. Pool, '24, head of the Department of Botany at the University of Nebraska, was elected first vice-president of the American Microscopical Society.

J. E. Ackert, '26, continues as secretary of the Microscopical Society for 1933. Professor Ackert and M. J. Elrod, Lambda '21, were named to represent their society in the council of the American Association.

Tau

F. A. Wolf, '27, has been elected editor of the newly organized Mycological Society of America.

Alpha Theta

E. F. Gaines, '30, was elected to the office of a councilor at the meeting of the Northwest Scientific Association.

DEPARTMENT OF INTERIOR'S ELABORATE EXHIBIT

ELABORATE plans are being made for the National Park Service's exhibit at the Chicago Exposition. The main feature of the exhibit will be a model of Mount Rainier, in the State of Washington, 9 feet high by 20 feet wide, modeled true to perspective, which will be illuminated by variegated lights to show the mountain as it appears from noon to twilight and on into the night. A glacier of ice will extend down the mountain side, and a snow storm can be reproduced, if the visitors so wish, by pressing of a button. The booth containing this model will be decorated to give a rustic national park atmosphere by the use of live trees, transported from Mount Rainier Park, to frame the model. These trees will also be so grouped in the foreground of the model as to give the effect of a miniature forest in which a camp fire scene will be reproduced. Automatic movies will be run off in the vicinity of the camp fire. Other features of the exhibit will be a large illustrated map of the United States on which special attractions of the national parks will be shown by means of colored transparencies.

Supplemental to the Park Service's exhibit, A Century of Progress officials plan to include in their geology section in the Hall of Science a booth devoted to the earth sciences as exemplified in the national parks. Here will be displayed eleven models depicting Grand Canyon, Carlsbad Caverns, Rainbow Bridge, Glacier Park, the Grand Tetons, Kilauea Volcano, Spruce Tree House in Mesa Verde, the Petrified Forests of Arizona, the Yosemite Valley, Bryce Canyon, the Fossil Forests of Yellowstone, and the Crater Lake in Oregon. There will also be an operating geyser, a relief map of Glacier Park, and a case containing specimens of petrified wood, fossils, and some literature. Colored transparencies telling the story of geology will surround some of the models, and the visitors may light up these transparencies.

Men have used strange methods in trying to convince people that they were different from the rest of the world. Yangti, Chinese explorer, used to have leaves and flowers of silk sewed on his trees every autumn to show that even they were not subject to the laws of the seasons.

—*Collier's*.

HAVE YOU READ . . .

Alpha Theta

"Manual of Plant Disease", by F. D. Heald, '30, McGraw-Hill, 953 p., \$7.50. This up to date edition is very favorably received in SCIENCE NEWS LETTER, March 18, 1933.

Beta

"Predatory Animals Held Useful to Farmers", in SCIENCE NEWS LETTER, December 10, 1932, p. 373, is a summary of the work done by Dr. Ned Dearborn, '30, for the University of Michigan School of Forestry and Conservation.

Delta

"Scientists Measure Size of Genes Without Seeing Them," in SCIENCE NEWS LETTER, January 14, 1933. Dr. John W. Gowen, '24, made this announcement before the American Association for the Advancement of Science.

"Seven Stages in Life of T-B Germ Given," in Dr. R. R. Mellon's report to the Society of American Bacteriologists. Ruth D. Richardson, '20, was his associate. The summary will be found in SCIENCE NEWS LETTER, January 28, 1933.

"Snakes Earmarked by Clipping of Tail Scales," in the January 14, 1933 SCIENCE NEWS LETTER. This work is under the direction of Dr. Frank N. Blanchard, '17, of the University of Michigan.

"Anemia Patients Die From Not Keeping Up Treatment," in SCIENCE NEWS LETTER, January 21, 1933, is a review of the work of Alexander G. Ruthven, '30.

Zeta

"Research Shows How Copper Aids Iron in Curing Anemia," by C. A. Elvehjem, '24. A summary of this experiment can be found in SCIENCE NEWS LETTER of January 21, 1933.

Iota

"Bacteriophage Makes Germs Swell, Burst and Disappear," by Prof. J. Bronfenbrenner, '28. This article will be found in the December 31st, 1932, issue of the SCIENCE NEWS LETTER.

Dr. Margaret R. Murray, '22, of Columbia University, made tissue culture of rat skull bone from embryos. The results of this experiment can be found in the SCIENCE NEWS LETTER of January 14, 1933, in the article, "Rabbit and Rat Embryos Are Grown in Laboratory."

Kappa

"Light on Eyes Blurred Spot Visible by Radiation," Dr. C. R. Garvey, '26, told the American Association for the Advancement of Science. SCIENCE NEWS LETTER, January 28, 1933.

Mu

"Rod-shaped Particles in Tobacco Mosaic Virus Demonstrated by Stream Double Refraction," by W. N. Takahashe, '28, SCIENCE Vol. 77, No. 1984, January 6, 1933. A summary of Professor Takahashi and T. E. Rawlins report to the American Association for the Advancement of Science, will be found in the January 13 issue of this year. Vol. 77, No. 1985.

Nu

"Discoveries in Pure Science Conquer Deadly Poison," in SCIENCE NEWS LETTER, January 28, 1933, p. 53, is a report of Mrs. Matilda M. Brooks, '28, and Dr. J. C. Geijers' newly discovered antidote.

Upsilon

"Though Dead, Plant Roots Continue to Drink Water," by Dr. Paul J. Dramer, '26. A review of this experiment will be found in SCIENCE NEWS LETTER, January 7, 1933.

Dentist's epitaph in a Connecticut cemetery:

"When on this tomb you gaze with gravity,
Cheer up! I'm filling my last cavity."

* * * * *

The mother of a flying cadet at Randolph Field wrote:

"Now, Son, do be careful, and whatever you do fly low and slow."

CHAPTER NEWS LETTERS

Beta

When Beta Chapter resumed work in the fall, we found that we had a rather small group of active members. In spite of this fact our president, Ralph Imlay, proceeded to organize a most interesting program, and from the beginning of the school year the chapter has been very much alive.

The opening lecture was given by Dr. C. A. Arnold, who spent the summer excavating plant fossils in southern Oregon. He illustrated his talk with moving pictures of the work of excavation at the quarry, and showed us specimens he had brought back from the chalk-like diatomaceous strata which contained the fossils.

Dr. S. A. Graham gave the next lecture, on "The Influence of Man on the Insect Life in the Forest," a very interesting subject. Other speakers on our winter program have been: Mr. Albert Pulling, who, with an almost unlimited supply of motion pictures, illustrated the relation between forests and summer camps, and Dr. John Nyboer, who with a most infectious enthusiasm, laid bare the mysteries of biological rhythms.

Our initiation meeting was held early in January, and our speaker was Dr. H. B. Lewis of Physiological Chemistry. He gave us an excellent address on "The Chemist and the Nation's Food Supply", a lecture packed full of the most interesting facts and comparisons. Fifteen new members were initiated that evening, and we take pleasure in introducing them to you: M. Lelyn Branin, Pin-dji Chen, Howard Curran, Howard K. Gloyd (Faculty), Ruth E. Godwin, Sam Granick, Theophilus P. Haines, Sherman Hoslett, Doris Hsu, Harold Leraas, Mae MacNeill, Merle Oleson, Annette Rudolphi, Reuben Trippensee, Harold Zavitz. We are confident that these recent initiates will prove valuable additions to our chapter, and there is no doubt that Phi Sigma will hear more about them in the future.

Our last meeting, at the time of writing, was held in the museums building, where Mr. Henry Vander Schalie gave us in a most interesting fashion "An Illustrated Review of the Phylum Mollusca..". We saw hundreds, even thousands of beautiful shells, land forms, fresh

water forms, and marine forms, and the usefulness of the tremendous collection to those who have to study any group of the Mollusca, was pointed out to us.

This meeting is an example of a rather interesting innovation which we are trying out this year. In the personnel of our Chapter there are many graduate students who have progressed far enough with their research work so that they can entertain us for an evening. They take us for an excursion in their laboratories, giving us, en route, an illustrated talk. The psychological effect of handling the actual material, and seeing what other members are doing, has done much to stimulate an active interest in the varied lines of investigation, and our meetings as well as the subsequent social periods hum with lively discussion.

We have been enjoying very much the tours of different departments, led by advanced research students who explain their own particular problem to us. Mr. J. L. Lowe outlined the work which he has been doing on Polypores of New York State, and explained how valuable a herbarium may be in an investigation such as his. The group was taken through the herbarium and shown specimens of special interest. The tour then continued from the Museums building to the Natural Science building, where Miss Jean E. Davidson introduced the members to her research problem. This deals with culturing certain fungi to establish not only their life cycle and manner of development, but also to clear up some taxonomic confusion with regard to the species concerned. Dr. C. D. Brown of the Zoology department followed with a very interesting discussion of the fresh water Polyzoa, which is his particular interest. The members who were present at this meeting believe that Dr. Brown must be also a mechanic, an engineer, an electrician and a plumber, as well as a zoologist, after seeing the apparatus which he devised to keep his material at various constant temperatures.

The increased attendance and interest at our meetings is sufficient proof that the programs are being enjoyed to the full.

Delta

Delta Chapter of Phi Sigma has had a very successful year. The first high light of the year being a trip to Mt. Katahdin, enjoyed by sixteen members of the society. We were exceedingly lucky in having excellent weather during the two days that we were there, and it certainly was an event never to be forgotten.

In the Fall we initiated eight new members into our group, and are expecting to receive as many more this spring.

During the year we have held some very interesting sessions, including talks by Mr. Hyland, of the Botany Department, on Figured Woods; Mr. Dirks, of the Entomology Department, on Butterflies; Kenneth Varney on Wild Rice; Mr. Ogden, a graduate student from Michigan, on Photography; and Dr. Dove from the Experiment Station on Rickets.

Delta Chapter was very lucky in being one of the few Chapters represented at the Scientific Convention at Atlantic City last December, and we also are expecting to have a member present at the National Convention to be held at Chicago in June.

Zeta

Zeta chapter, University of Wisconsin, started the 1932-1933 school year with a picnic. The forty members present will bear testimony to its success. Kitten ball, touch football and a steak fry provided the entertainment.

Thirteen men, representing nine (9) university departments, became active members of Zeta chapter at the fall Initiation Banquet, at which the new Assistant Dean of the College of Agriculture, I. L. Baldwin, was toastmaster. H. E. Sagen, Ag Bacteriology, Zeta chapter president, initiated the new members. H. L. Ahlgren, Soils and Agronomy, gave the Initiates' Response. F. L. Hsaw, Professor of Zoology, spoke on "The Physiology of Uterine Endometrium."

We have had a number of interesting lectures this year as part of our open meeting program. Talks have been given by: K. P. Link, Professor of Biochemistry, "Biochemistry of Plant Diseases"; L. R. Jones, Professor of Plant Pathology, "Plant Pathology in the Orient"; B. M. Duggar, Professor of Physiological and Applied Botany, "Mushrooms"; K. I. Johansson, Professor of Genetics, "Swedish Biological Research in Relation to Agriculture"; and C. A. Elvehjem, Professor of Agricultural Chemistry, "Iron and Copper in Relation to Hemoglobin Formation", sponsored by Sigma Delta Epsilon, who invited Phi Sigma to attend.

Our future schedule calls for some more open meetings, closed meetings and a spring initiation banquet before we finish what we can certainly designate as "a well worthwhile year" for Zeta chapter.

Eta

Eta Chapter has had a very successful and progressive year. The first semester was almost entirely devoted to discussions by members on individual problems, papers and research activities. An "open" meeting was held in December for all biology students of the University. Dr. Tote, epidemiologist for the Akron Health Department talked on "Tuberculosis and Its Incidence in Akron." This lecture was particularly interesting since it dealt for the most part on conditions in the local rubber factories.

The second semester has been devoted to short talks by members on any subject, usually a review of some biology course. These bi-weekly talks are very instructive and worth while. In February Eta held its annual "campus meeting," to which the entire school was invited. This year Dr. U. S. Gordan spoke on "Venereal Diseases."

At the present time nearly all of the active members are enrolled in courses of individual problems. Prospective pledges are working on research problems and papers, the completion of which is one of the requirements for membership.

Eta Chapter is looking forward with great enthusiasm to two future events. One is the annual reading and discussion of student research reports; the other is the spring banquet at which the new members are initiated.

Theta

Three meetings have been held by the Theta chapter during the present academic year. The policy in every case has been to have each business session followed by some lively topic presented by a qualified person on the campus. At the first meeting Dean Ward Giltner of the Veterinary Division gave a brief address on "Human Hygiene," with special emphasis placed on the possibilities for work in the field of mental hygiene. Dr. H. R. Hunt of the Zoology Department had the floor at the second session—he presented a rather complete discussion of his genetical researches with flexed tail mice. The last meeting of the local chapter was favored with a progress report of research work on a disease of greenhouse tomatoes and was given by Prof. H. L. Seaton of the Department of Horticulture. Discussion periods regarding the topic in question have been important features of all of these meetings.

Theta chapter's principal ambition this year, from the standpoint

of chapter business, is to find some method of overcoming the present lack of interest on the part of its members as shown by failure in the payment of dues and in absences at meetings. Mr. L. A. Cochran is largely responsible for our present attempt to draft changes in the constitution and by-laws that will cope with this situation. It is apparent that other chapters of Phi Sigma are having similar difficulties regarding the payment of dues and general interest in Phi Sigma. The members of Theta chapter hope that their proposed addition to the constitution and by-laws of Phi Sigma will point the way toward a more active organization.

Theta chapter decided not to send a delegate to the convention at Atlantic City, New Jersey, during the Christmas holidays. The general opinion favored a special effort, instead, to send more than one delegate to the national meeting at Chicago in June, 1933.

Iota

Iota Chapter of Washington University, St. Louis, has been enjoying a highly successful year which reached its peak in the initiation of 25 new members at the February banquet. At this initiation and banquet we were proud to receive Dr. Evarts Graham as our third honorary member. Dr. Graham is well known to everyone both as the past president of the American College of Surgeons and a world authority on gall bladder. At the same time Dr. C. W. Dodge of the Botany department, Dr. Margaret Kerly of the Biochemistry department, and Dr. Abigail Smith of the department of Medicine were initiated as faculty members. New active initiates consisted of the following: Isabel Picken, Arthur Brandon, Ralph Bensky, Katherine Pfeifer, Charles Hoagland, Eleanor Werber, Elmer Buecher, Maurice Orgel, Karl McKinsty, Alexander Steiner, Robert Liggett, Helen Aff, Harry Wachter, John Saxton, Mary Schmeckebier, Charlotte Wiegard, Florence Gausmann, May Gregg, Margaret Erlanger, Ruth Erlanger, May Gregg.

The main address of the evening was given by Dr. Graham. This was followed by the introduction of the toastmaster of the evening, Dr. William B. Wendel, a past president of Iota chapter, who in turn called on the various initiates to make speeches by way of a mock initiation. The titles of these speeches were most ridiculous and afforded much enjoyment to the "old" members. This preliminary event was then followed by the real initiation ceremony.

Iota chapter has been unusually fortunate in hearing so many interesting and thoroughly enjoyable talks this year.

At the November meeting Dr. Leo Loeb of the department of Pathology and brother of the famous Jacques Loeb spoke on the subject, "The Biological Aspects of Individuality." Dr. Loeb is at present engaged in writing a book on this subject.

On December 20th Dr. C. W. Dodge of the Botany department talked on "Fungi Producing Ringworm." Dr. Dodge has just sent to press his new book on the subject "Medical Mycology."

"Biological Aspects of Allergy" was the subject chosen by Dr. H. L. Alexander, Associate Professor of Medicine for the January meeting. Dr. Alexander edits the "Journal of Allergy."

The general discussions following each meeting at which time questions may be asked the speaker are looked forward to by all our members and the social period following the talk presents an opportunity for us to meet visitors and become acquainted with our own members. We are keenly anticipating the March meeting when Dr. Edward Doisy of the Biochemistry department of St. Louis University will speak on "The Follicular Hormone."

Kappa

Kappa chapter has been enjoying a very active year under the leadership of our president, Mr. James Brennan, from the Entomology Department. Meetings are every two weeks, the programs are varied. A faculty member may be asked to give us a lecture, or the program may be furnished by three or four of our active members explaining their own research work. This last type of program always brings forth a very interesting discussion that we feel is quite worth while.

We initiated nineteen in the fall and at our last meeting on the evening of March 23, we held our spring initiation for the following eleven students: Ruth Cady, Bacteriology; Barbara Barteldes, Lyman Henderson, Arthur McKinstry, Entomology; Sloan Wilson, Anatomy; Sherwood Newton, Clyde Thorman, Walter Varvel, Psychology; Blanch Whitla, Wallace Lane, James Ferron, Zoology. Dr. Treece from the Bacteriology Department and a charter member of Kappa chapter added much to the pleasure of the evening by giving us some of the "high spots" in the history of our chapter.

This chapter is again offering an award of fifty dollars for the most outstanding piece of research for the year in the Biological Sciences. This award is granted at a dinner meeting in May at which time the recipient gives a summary of his work.

Our graduate school continues to gain in numbers, not in spite of, but probably because of general economic conditions so that our Biological Sciences have many interested in research. Also it seems that more seniors are beginning to do problem work. This gives Phi Sigma an opportunity to carry out what we feel is one of its main objectives—to encourage the beginner in research.

The following list will give some idea of the research being carried on by our members. These titles are all of work being completed this year and the majority of the papers will appear in some biological journal in the near future.

Monograph of the Pangoniinae (Diptera; Tabanidae) in Nearctic America, by J. M. Brennan, Entomology Dept.

The Genus *Lethocerus* (Hemiptera: Belastomatidae) of the World, by Carl Cummings, Entomology Dept.

Notes on the Parnidae (Coleoptera) with Descriptions of Ten New Species, by Milton Sanderson, Entomology Dept.

Origin and Development of the Crop in the Chick, by Marshall Mayberry, Botany Dept.

A Study of Some of the Factors Influencing Germination of the Spores of *Phyllosticta solitaria*, by Irma Burgert, Botany Dept.

The Wood Anatomy of Some Indigenous Kansas Shrubs, by Donald Obee, Botany Dept.

Morphology and Anatomy of *Lygodesmia juncea* (Pursh) D. Don, by Eliza Span, Zoology Dept.

A Discussion of the Cestoda Found in Poultry in and around Douglas Co., by O. B. Ferry, Zoology Dept.

A Comparison of the Skeleton of Juvenile and Adult Barn Owls (*Tyto alba pratincola*), by Frederick M. Baumgartner, Zoology.

Notes on *Cuterebra* larvae parasitic upon the Oklahoma Cottontail Rabbit, and notes on a tapeworm from the Mississippi Kite, *Ictinia mississippiensis* (Wils), by A. B. Leonard, Zoology Dept.

An Addition to the Amphibian Fauna of Arkansas, and On the Relationships of the Lizards *Coleonyx brevis* and *Coleonyx variegatus*, by Hobart M. Smith, Zoology Dept.

A Revised Check List of the Mammals of Kansas, by Claude W. Hibbard, Zoology Dept.

Some Factors involved in the Augmentation of Coronary Blood Flow due to intravenous injection of Hypertonic Glucose Solution, by David T. Loy, Physiology Dept.

The Evolution of Cerebral Action Currents in the Animal scale, by F. Theodore Perkins, Psychology Dept.

A Study of the Interrelationship of the Senses thru Reaction-time, by Robert Brigden, Psychology Dept.

Problem Solving Activity in the Macacus rhesus Monkey, by Charles Young, Psychology Dept.

The Lower Sense Modality deficiencies in a Color-blind subject, by Clyde Thoroman, Psychology Dept.

The Selection Action of Crystal Violet and Brilliant Green upon Bacteriophages, by Alvin Y. Wells and Noble P. Sherwood, Bacteriology.

The Selective Action of Dyes and other Disinfectants upon Bacteriophages, by Alvin Y. Wells and Noble P. Sherwood, Bacteriology.

Lambda

Lambda chapter, at the University of Montana, held its spring initiation on May 3, 1932, at the usual picnic grounds up Rattlesnake creek. Initiation ceremonies were held in a natural amphitheater between the stream and high cliffs. Unfortunately, it started to rain, and roaring fires failed to warm the crowd. Part of the refreshments were cooked up there, and the meeting adjourned to town, and coffee was made, and talks given at the Natural Science building. Ten candidates were initiated.

May 17, two more were initiated at a special meeting.

Although only eight active members were back last fall, we have had quite a successful year and officers were elected in the fall. Those chosen were: President, Mary Young; vice-president, Fred Benson; secretary, Marjorie Davis; treasurer, Joe Lasby.

Major topics presented at meetings during the last year were: "Blood Types", by Professor Matson; "The Nature of Bacteriophage", by Professor Wells, a new professor in the Biology Department; an illustrated talk by Dean Mollett of the Pharmacy School, on "Florida"; and "Experiments in Selective Logging", by Joel Frykman of the

School of Forestry. Other topics which have been presented are: "Botany and Zoology in Everyday Life", by Mrs. Gilbert Davis; "Phylogeny of Angiosperms", by Dr. C. L. Hitchcock; "Wisconsin Tobacco Culture", by Arne Fosdal; "Survey of Biological Literature", by Mary Kurth; "Civil Service Reports for Botanical and Related Fields," by Mary Young. We anticipate talks from Marjorie Davis on "Molds"; Marie Hopkins on "Embryology of The Chick"; and Mary Young on "Plant Evolution".

Two public meetings were held; at the first Dr. C. B. Phillips of the Rocky Mountain Spotted Fever Laboratory at Hamilton, Montana, gave an illustrated talk on "Yellow Fever Work in Africa" from his own experiences, and at the second public meeting Dean Mollett of the School of Pharmacy showed several reels on Dental Health and later the same evening films concerning growth movements of plants and the activities of spiders, which were sponsored by Phi Sigma, were shown.

A new member of the Department of Botany is Dr. C. L. Hitchcock, who received his Ph. D. at Washington University in St. Louis in 1931.

Three members were initiated into the chapter on Dec. 18, 1932. They were: Dr. C. L. Hitchcock, faculty; Miss Marie Hopkins, a graduate student working on Embryology; and Patrick Shea, an undergraduate Forester.

* * * * *

FRESHMAN CONTRIBUTIONS TO SCIENCE

Blue-greens pollute water, drive people to drink beer and thereby break prohibition.

There are few plants in the north as the climate of B. C. is so severe that the inhabitants have to go somewhere else to live.

One of the most important trees of this region is the *Pseudotsuga taxifolia* or "Douglas Pine."

Plants which are monocots are corn, wheat, and other grains; all kinds of hay, and all grasses.

The nucleus may indeed be called the brain of the cell for it is there that reproduction takes place.

The nucleus is the little animal that lives inside the cytoplasm.

In the section could be seen the stele or vascular cavity.

If the crystals of copper sulfate will mix with the water the rate of diffusion will try to be found out.

Gloeocapsa is the simplest of all vegetables.

The Ginkgo is the only tree which has a modal sperm.

After these preparations slit the jugular vein of the horse and let it stand in an Erlenmeyer flask for 3 hours at 80° C.

An anther is two little loves united by a band of tissue.

Live stock eat the forage affected by ergot and it emancipates them.

Mu

Mu Chapter of Phi Sigma had difficulty in getting its activity started in the fall semester ('32) due to the sudden change in plans of the new president, Gordon True, necessitating his leaving this campus. After some delay a meeting was called at which Joe K. Ellsworth of Entomology was elected to the presidency. After this the chapter was ready for a profitable academic year.

It has been our policy this year to shorten the business meetings and hold them earlier in the evening, so that the members could have time for other things on the same evenings.

The initiation banquets in the fall and spring were very enjoyable. There were 22 initiates in the fall and 24 in the spring, including one faculty member, Professor George H. Hart of Animal Husbandry at the University of California Agricultural College at Davis. We had a new plan this year by which we introduced the new members to the older members and to each other. Each one was called upon in turn to relate briefly his most difficult experience. The responses were quite varied and most entertaining.

Among those of our members who have recently received their Ph. D. degrees were David R. Goddard, Herbert L. Mason, both of Botany, and James L. Leitch of Zoology.

Nu

The Nu Chapter has so far had a successful season with all indications that it will continue to do so until the end of the present school year. At the first meeting, we elected Mr. W. M. Brownlee vice-presi-

dent and considered several men who were eligible to become Phi Sigma members.

At the next meeting, a program committee composed of President R. H. Parks, Mr. Osterman, and Mr. Hoare were appointed to arrange programs for future meetings. Professor C. D. Dieter, who is a member of the Biology staff, gave us a description of the buildings, men, and work done at Woods Hole. Prof. Dieter spent the last summer at Woods Hole, working under the Linton Memorial fund. Dr. Edwin Linton gives this money to a member of the teaching staff or to some deserving student at Washington and Jefferson College, so they may study at Woods Hole and thus be better prepared for teaching or research work. Prof. Dieter was occupied with the course in Embryology and a research problem on *Fundulus hortelii*. This problem concerned itself with the origin and differentiation of certain chromatopheres.

On November 8, 1932, at North Hall, W. E. Abbott, W. A. Harris, B. M. Kagan, H. G. Kunz, and M. D. McDivitt were initiated into the Phi Sigma. Prof. Dieter gave a paper entitled "Mutations and Orthogenesis as a factor in Organic Evolution."

At succeeding meetings, papers were given by the newly elected members. The titles of them were "Isolation of Crystalline Pepsin and Trypsin", "The Internal Menagerie", "Events at the Meetings of the A. A. A. S.", "The Human Side of Research as Exemplified by Dr. A. V. Hill and his Work in Bio-Physics", and "The Biology of Death".

Mr. Homer C. Porter, a faculty member of Phi Sigma, married Miss Blanche McCracken, daughter of Mr. and Mrs. F. J. McCracken of Washington, Pa., on August 13, 1932.

We plan to elect more men into Phi Sigma soon.

Sigma

Sigma chapter is at present non-functioning, and has been for about a year. Financial difficulties began to play havoc with the membership about two years ago. Several major officers were forced to leave school because of funds, and it became very difficult to get members to pay their dues, therefore the chapter ceased, temporarily we hoped, to function.

Prospects are far poorer now than they have been, as the incoming legislature is threatening to cut the university drastically for the coming two years.

Tau

Dr. A. S. Pearse and Dr. F. G. Hall, of the Department of Zoology, spent the summer in the Maya country of Yucatan working on the cenotes of that region. They were working under the auspices of the Carnegie Institution and Duke University.

Mr. H. W. Harvey, assistant in botany, was at Cornell University taking work in Mycology. He expects to receive his M. A. degree here this June.

Mr. S. R. Tipton, assistant in zoology, continued his research at Duke during the summer on the respiration of red blood cells in addition to assisting in the general zoology course.

Dr. H. L. Blomquist, professor of botany, spent the summer at Lake Junalaska, North Carolina, where he taught field botany in the Junalaska Summer School, which is affiliated with Duke University.

Dr. Bert Cunningham had charge of the general course in zoology the first term of the summer session. Mr. C. W. Hooker and Miss Helen Butts assisted him. The second term Dr. Cunningham taught general embryology.

Mr. C. G. Bookhout, assistant in zoology, was here most of the summer continuing his research on germ cells.

Dr. G. T. Hargitt, professor of zoology, taught cytology the second term of summer school.

Mr. N. E. Rice, assistant in zoology, was married in June to Miss Gladys Garnett of Lexington, Kentucky. They returned almost immediately to Durham, where they are making their home. Mr. Rice attended the summer school and continued his research on amoeba and Mrs. Rice was appointed biology librarian.

Dr. I. E. Gray was here the first term of the summer session teaching field zoology. He spent the latter part of the summer working on fishes at the U. S. Bureau of Fisheries station at Beaufort, North Carolina.

Dr. Ruth Addoms vacationed the first part of the summer, taking an automobile trip up to Wisconsin and across to New York. She

returned for the second term of summer school, in which she taught the general course in botany.

Continuing work on tobacco mosaic occupied the time of Dr. F. A. Wolf, professor of botany, for most of the summer. Except for several trips about the state observing the disease in the field, he was here at the University for the summer months.

Dr. C. F. Korstian, head of the department of forestry, spent the summer visiting forests, forestry schools, and forest experimental stations of Europe. Leaving early in July, he travelled through England, Scotland, Holland, Germany, Switzerland, and France. At Nancy, France, Dr. Korstian attended the meetings of the International Union of Forest Research Organizations, at which he represented the United States on an international committee, composed of one delegate from each country, and whose purpose it was to act upon business matters of the organization. He reports as one of the most interesting features of the trip a two-weeks tour of some of the forests of France, which included the secondary forest school at Lebarres, forests in the vicinity of Blois, Bordeaux, Pyrenees, Marseille, Barcelonnette, Col de Vares, Saint-Michel-de-Manrienne and many others.

* * * * *

Tau chapter has just completed a successful and progressive semester. Officers for the year were elected last spring: President, Sam R. Tipton (Zoology); Vice-president, Dennis H. Latham (Botany); Secretary, Lewis E. Anderson (Botany); Treasurer, Cazyln G. Bookhout (Zoology).

The programs during the past semester have included talks on: "The Absorption of Water in Plants"—Dr. P. J. Kramer of the Botany Department; "Certain Characters of Taxonomic Importance in the Genus *Viola*"—Mr. J. H. Pyron, assistant in botany; "The White Pine Weevil"—Mr. William Maughan of the Forestry Department.

Members of Phi Sigma who were at the scientific meetings in Atlantic City are Dr. P. J. Kramer, Dr. H. J. Oosting, and Dr. Ruth Addoms from the Botany Department; Dr. C. F. Korstian from the Forestry Department, and Dr. G. T. Hargitt from the Zoology Department. Dr. Kramer gave a paper on "The Intake of Water Through Dead Root Systems and Its Relations to Absorption by Transpiring Plants."

At the meetings Dr. A. S. Pearse was elected Vice-president and chairman of the zoological section. Dr. G. T. Hargitt was elected as

a member of the Council, after serving eight years as secretary of the zoological section.

On December 13 Phi Sigma held its fall initiation banquet. The main speaker was Dr. Paul M. Gross of the Chemistry Department, his subject being "Research and Its Relation to Practicality." Dr. H. J. Oosting, formerly of Theta Chapter at Michigan State College, was affiliated at that time. Those who were initiated are: Faculty membership, Dr. H. S. Perry (Botany); active membership, Mr. W. S. Cornwell (Zoology), Mr. R. Harkema (Zoology), Mr. K. C. Kates (Zoology), Mr. C. W. Kelley (Zoology), Miss Janet McAfee (Zoology), Miss Idolene McManus (Zoology), Miss Lois McNeal (Zoology), Mr. P. S. Reddish (Zoology), Mr. Frank Smith (Botany), Miss Minerva Waynick (Botany), and Mr. G. A. Yeargan (Zoology).

Dr. F. G. Hall will spend the next semester and summer at Cambridge, England, with a short visit to Copenhagen, Denmark. He expects to continue his work on respiration.

Dr. and Mrs. H. L. Blomquist are the proud parents of a daughter, Betty, born November 24.

Dr. Blomquist is at present making a survey of the grasses of North Carolina. He has made extensive collections from all parts of the state and has checked collections of several large herbaria which contain specimens from North Carolina. So far he has collected 285 different species of grasses in the state and estimates that there are at least 300 species in all. Dr. Blomquist is also working on mosses, liverworts, and ferns of the state and particularly of the Duke Forest.

We are very glad to welcome a chapter of Sigma Xi at Duke University at this writing. This will supplant the Sigma Xi club which has been in existence here for a number of years.

Mr. D. H. Latham, assistant in botany, was married on December 23 to Miss Thelma Mauney of Raleigh, North Carolina. Mr. Latham will receive his M. A. in June, after which he expects to continue on his doctorate.

Mr. J. H. Wallace received his M. A. degree here last June and is now with the Wilson-Toomer Fertilizer Company. He is stationed at Sanford, Florida.

Dr. Leon C. Chesley received his doctorate here last June. After spending the summer at the U. S. Bureau of Fisheries laboratories at Beaufort, North Carolina, he went to a position at Memorial Hospital in New York City.

Mr. H. F. Williams is studying at Columbia University this year.

Dr. R. W. Root, who is teaching at City College of New York, spent the summer at the Oceanographic Institute at Woods Hole, Mass., working on the respiratory functions of the blood of marine fishes.

Miss Lora Lee Robertson is teaching biology at Mitchell College at Statesville, North Carolina. Miss Robertson received her M. A. degree here last June.

Phi

Phi Chapter is having another successful year. In addition to the meetings, which had to do with the pledging and initiating the new members, four regular meetings have been held this year, and several special sessions were enjoyed.

An unusually large number of new members were initiated at the fall term meetings. The following is a list of these new Phi Sigmas with their subject of specialization:

Walter Batcheldor.....	Pre-medic	Fernand Hamel.....	Pre-medic
Gunther Blombach.....	Pre-medic	Marion Hough.....	Bacteriology
John Brown.....	Geology	Joseph Kropp.....	Pre-medic
Leland Burkhardt..	Plant Chemistry	Headley McBride.....	Forestry
Dr. Donald Chapman.....	Geology	Robert Paine.....	Forestry
Lee Charest.....	Pre-medic	Dr. Derrie Parmenter....	Medicine
Almon Cross.....	Pre-medic	Arnold Rhodes.....	Forestry
Thomas Day.....	Pre-medic	Kenneth Sawtelle.....	Poultry
Maurice Dinnerman ...	Pre-medic	Dr. Lawrence Slantez..	Bacteriology
Dana Goodwin.....	Poultry	Mary E. Wilbur.....	Pre-medic
Eugene Gormley.....	Pre-medic	Dexter Wilcome.....	Pre-medic

At the regular sessions for the reading of papers, the following topics were discussed:

- "A Camping Trip in Canada"—Professor C. F. Jackson.
- "Is the Water in Protoplasm Living?"—Dr. Stuart Dunn.
- "The Gold Mines in the Black Hills"—John Brown.
- "Protozoan Parasites in the Human Body"—Maurice Dinnerman.
- "Our National Forests"—Headley McBride.
- "The Atlantic City Meeting"—Pres. Lloyd Wells.
- "Vitamines"—Mrs. Charles Hottorff.
- "Evolution of the New Hampshire Reds"—Dana Goodwin.
- "Relation of Forests to Snow"—Dr. Clark Stevens.

“Photosynthesis in Nature and in the Laboratory”—Russell Bissey.

“The Biological Laboratory in Bermuda”—Associate Professor A. D. Jackson.

“New England Weather”—Dr. Donald Chapman.

“The Nation’s Health”—Miriam Ryder.

“The New Phylum of the Animal Kingdom”—Marjorie Parsons and Charlotte Hunkins.

This last summer a large number of present and former Phi Sigma members attended the annual week-end visit to the New Hampshire Marine Zoological Laboratory at the Isles of Shoals near Portsmouth, N. H. There are always several Phi Sigma members attending the Summer Sessions there.

About twenty-five members went on a week-end trip into the White Mountains in October. They camped on Guinea Pond and climbed Mt. Belknap.

A supper outing was held on November 9 at Mendam’s Pond. Twenty-six members were present for the evening of supper, games, songs.

The annual Christmas party was held at the home of Professor and Mrs. C. F. Jackson on December 17. After the games Santa Claus distributed gifts to all of the members. Christmas carols closed the evening.

President Lloyd Wells and Russell Bissey attended the Phi Sigma sessions of the A. A. A. S. meetings during the Christmas vacation. Mr. Bissey gave a paper on: “The Control of Yellow Hawkweed”. They were disappointed at the poor attendance.

Phi Chapter devotes one meeting each year to the interests of its pre-medic members. This year the speaker was Dr. Charles Duncan of the New Hampshire State Health Department. He gave an interesting talk on medical practices in New Hampshire.

Chi

Chi chapter is happy to announce the completion of a very successful year. The establishment of a definite objective has, in a large measure, accounted for the chapter’s success.

This year Chi chapter chose as its project the purchasing of a motion picture projector. It will be of much use to us in studying

life histories of plants, in bacteriology, and in entomology. We also plan to make the projector available to the other departments and groups on the campus. As a means of raising money for this purpose we hold pie sales in the biology building on several afternoons of each week.

In December we held initiation for twelve new members which has greatly strengthened our group. Our initiation banquet, a turkey dinner, was held in the biology building. The meal was all prepared in the biology building by one of our members. The turkeys, baked potatoes, and rolls were all cooked in the dry sterilizing ovens in the bacteriology laboratory. The banquet was served on tables in the botany laboratory with table cloths of strips of wrapping paper. The place cards were prepared by one of our entomologist members and were cleverly decorated with mounted insects. Potted plants from the green house made attractive center pieces. There were about forty present, including our guests. We felt that our banquet was very appropriate for the occasion.

At present we are making plans for our annual spring outing which we hold some time in May. On this occasion we take a picnic lunch with us, go out into the mountains and spend the day studying the plant and animal life.

Omega

Omega Chapter has enjoyed a year of very profitable and pleasant activities. Lectures by faculty members of the University of Oklahoma and other Oklahoma institutions have featured most of the meetings.

The November meeting was held at the home of the Chapter President, Fred A. Barkley. Reports and discussions of papers presented in the Biology Section of the Oklahoma Academy of Science Meeting constituted the program for the evening.

In January the Chapter met at the home of George Phillips, State Forester, in Oklahoma City. Dr. Paul B. Sears, Head of Department of Botany at the University, spoke on "Post-glacial Climates As Revealed by Bog Pollens", and Dr. R. D. Bird of the Zoology Department of the University talked on "Dragonflies". Both lectures were illustrated with lantern slides.

Dr. Ray M. Balyeat of the Balyeat Hay Fever and Asthma Clinic in Oklahoma City spoke to the Chapter at its February meeting. His subject was "Migraine and Other Allergic Forms of Disease". Dr. Mildred H. Richards, a member of Omega Chapter, has worked with Dr. Balyeat in his research on the inheritance of allergy.

The Spring business meeting of the Chapter was held February 28, at the home of Dr. A. Richards, Head of the Department of Zoology at the University. The business session was preceded by an illustrated talk on "The Vegetation of Oklahoma" by Dr. E. L. Little, Professor of Botany at Oklahoma Southwestern State Teachers College, Weatherford, Oklahoma.

Officers elected for the coming year are: President, Billy Longmire; Vice-president, Charles Smith; Secretary, Helen Joe Talley; Treasurer, O'Reilly Sandoz.

Five new members were elected to active membership: Kelly De-Busk, Eastern Oklahoma College, Wilburton, Oklahoma, and Robert G. Messinger, Arnold A. Schillinger, Dale W. Swart, and Mrs. Bess L. Thuringer, University of Oklahoma. Initiation will take place at the Spring banquet to be held March 30. Several members have been received by affiliation with the Chapter this year: Minnie D. Stambaugh from Kappa Chapter at Kansas University, Charles H. Mellish from Epsilon Chapter at Denver University, Albert H. Trowbridge from Alpha Eta Chapter at Oklahoma A. & M. College, and Harold M. Hefley from Tau Chapter at Duke University.

Other activities and meetings have been planned for the remainder of the year, including a field trip to Edmond, Oklahoma, on April 8, the initiation banquet, and several lectures which promise to be of special interest.

Wilton Ivy and Aleen Berlin, two of our active members were married during February. Ivy says that although Germany might accept a king and Italy a Mussolini, he has accepted a dictatorship. A set of salad forks was presented to them as a token of our esteem, at the annual banquet. We all wish them success and happiness.

Wm. H. (Bill) Behle has been at the University of Southern California at Los Angeles since the beginning of the year. He is doing research work in connection with a fellowship offered to him shortly after he completed his work upon his Master's thesis here. We were sorry to see him leave, but we hear that he enjoys his work and is making rapid progress.

Richard Wm. Bush is back in town again after an absence of more than six months. He is connected with the Entomology Bureau, Sugar Beet Division, and spends a large part of his time in Ogden.

W. W. Newby broke into print recently with his article in the Biological Bulletin, December 1932, covering research work that he has done upon the early embryology of the Echiuroid, Urechis.

Elmer G. Berry had two articles published recently. The first appearing in the June 1932 number of the Utah Academy of Sciences which was titled "Preliminary Notes on the Mollusca of Lake Bonneville". Prof. A. L. Crawford of the Ore Dressing Microscopy Division of the University of Utah was co-author. The second article, "The Rediscovery of *Oreohelir haydeni* (Gabb)" appeared in the October issue of the Nautilus of 1932. He has received letters of recognition from authorities on this subject from all parts of the country. Another article in which Mr. Berry has collaborated with Dr. R. V. Chamberlin will appear in the June issue of the Nautilus. This work is upon the Pliocene Mollusca of Cache Valley, Utah, and will describe four new species of mollusca to science.

Conrad Larsen is an aspiring medic. That is one of the reasons why we see so little of him.

The annual banquet and dance held February 14 in honor of the new members and the founding of the Alpha Lambda chapter was a complete success in spite of the slowness of the service. Elmer G. Berry is to be complimented upon his success as a toastmaster. Gerald Peterson, Dr. W. P. Cottam and President Ira Telford presented short and clever speeches which were well adapted to research ideas and which were well received. Although Dr. Chamberlin was promised that he was not going to be called upon, he responded with his usual good humor with remarks which were to the point. The initiation was brief and solemn. The following members were initiated: Ruth Kirkpatrick, Allan C. Randle, Wilton Ivie, Wm. F. Carbine, Stephen D. Durrant, Gerald M. Peterson, Royal Lee Brown, Harry B. McEwen, Marcella Nebeker, Fred J. Foster. A feature of the banquet was the place cards which were blocked with the Phi Sigma coat of arms. They were in the form of dance programs and were designed by W. W. Newby, executed by Dorothy Naylor, and lettered by Elmer G. Berry.

Dr. M. S. Johnson, who is upon leave of absence, is still at Yale University doing research work.

Dorothy Naylor has completed her work in education. We are certainly sorry to see her leave.

The following will receive their B. A. degrees in June: Ralph F. Hill, Lowell Woodbury, Frank P. Giles, Wm. F. Carbine, Allan C. Randle.

Several other members will probably have their work completed upon their Master's degrees.

Although the fall trip to the Smith & Morehouse is just a memory, we are anticipating the spring trip with considerable pleasure. About thirty-five members were present on this previous trip and the atmosphere was certainly congenial. We are indebted to Dr. Chamberlin for his securing the lodge for these parties.

Alpha Alpha

Phi Sigma, Honorary Biological Society of the University of Southern California Campus. Alpha Alpha Chapter has held regular monthly meetings during the year since October. The program for October was given by Professor Cathine Beers, of the Zoology department, of U. S. C. She spoke on the subject, "Three International Congresses" which she attended during her sabbatical leave from the university the preceding year. Congresses were, The Homeopathic Medical Congress in Paris, The Eugenics Congress in New York City, The Genetics Congress at Cornell Univ. at Ithaca, N. Y. Miss Beers also gave a summary of her research work which she accomplished at Columbia University during the year of Sabbatical leave, which genetic research work was done on the *Drosophila obscura*, the vinegar fly. This was most interesting when she reported the young flies were treated with X-ray and changes affecting eye color, presence of bristles, wing position and size, and venation of the wing were attained. The research is being continued. The November meeting was held at the beach cottage of Mr. and Mrs. W. S. Kienholz, Sunday Nov. 27th, 1932, on account of low tide—1.4 at 3:10 P. M. Mr. Kienholz is a Phi Sigma member. The cottage "Kienies" is three miles north of Tapanga Canyon and Santa Monica beach. About sixty members and friends gathered and collected many choice marine plant and animal specimens during the afternoon.

Dr. George Johnstone and Dr. Andrew C. Life of the Botany department of U. S. C. and Dr. F. M. Baldwin, Professor Mary C. Foster of Zoology department U. S. C. and Mr. Howard Hill—Conchologist at the Natural History Museum of Exposition park, were all present to aid in the expert identification of the specimens collected.

Several species of Algae were collected. Of the sub-class Phaeophyceae—two species of Dictyota, two of Zonaria, one of Ectocarpus, a Colpomenia, three species of Desmarestia, one Scytosiphon.

Of the Laminariales order—species of Macrocystis, Eisenia, Egregia.

Of the Facalea order, species of Pelvetia, cystoseira, sargassum, and Halidrys.

Sub-Class Chlorophyceae—Species of Codium, Ulva, and Enteromorpha.

Also other species too numerous to mention.

Also animal specimens:—Marine invertebrates secured at Phi Sigma outing at Topanga Beach.

Sponges—3 species.

Encrusting Bryozoa—several species.

Annelids—Sand tube worms—Sabellaria, Scaled worms—2 species Polynoidae, Nereid worms, Rock worm—Sipunculus.

Echinoderms—Brittle starfish, Purple sea urchin, Red sea star, Common Starfish, 2 other species of starfish—Linchra Columbiæ, Asteria Miniata.

Crustaceans—Tide—pool shrimp, Hermit Crab, Hairy Rock Crab, Common Shore Crab, 3 other species Crabs—Isopoda, Amphipads, Acorn Barnacles.

Molluscs—3 species Nudibranchs, Sea Hare, Calif. Oyster, Septifer, Cumingia.

Gastropods—Calif. cone shell, Calif. olive shell, Rock purple, Unicorn shell, Turban shell, Wavy top shell, Dome shell, Amphissas, Marginellas, Bittiums, Channeled Murex, Circled Murex, Calif. Cornry, Periwinkles—2 species, Slipper shell, Ladder shells, Black abalone. Giant Key hole Limpet, Volcano Key hole Limpet, Plate Limpets, File Limpets, Shield Limpets.

Clams—Saxicava, Calif. Lucina, Wedge Clam, Calif. Mussel, Rock oyster (clam), Piddocks, Pea Pod Clam, Rough Limpets, Owl Limpets, Seaweed Limpets, Mossy Chitons, Shomy Chitons, Red Chitons, Worm shell, Horsehoof shell, Red Top shell.

A delicious steak dinner was served at 6:30 P. M. A program followed the dinner—also a social hour.

No meeting was held in December on account of too many activities of "Home-Coming" week on the campus.

At the January meeting, prospective members were asked to give a short talk about their research work being accomplished on the U. S. C.

campus. Twelve students gave reports; several were unable to be present. At the business meeting, sixteen were elected to membership.

The February meeting was the semi-annual Initiation banquet at Menlo Manor. The following were initiated into membership. (1) Dolores Bullack, (2) Olive Hartley, (3) Josephine Hervey, (4) Aaron Jensen, (5) Clyde Knopf, (6) Florence Landry, (7) Margaret Ligon, (8) Charles Long, (9) Tien Djen Ni, (10) Aloys Nicholson, (11) Eric Nies, (12) Mildred Pomeroy, (13) Pearl Sherman, (14) Gertrude Williamson, (15) Richard Tibby, (16) Jack Rempel.

The program followed the dinner. Dr. G. E. McGinitie, Director of Kerkhoff Marine Laboratory, California Institute of Technology, gave an illustrated lecture on "Life History of some of the Marine Animals." This was very instructive and interesting, especially the reported result of his research findings regarding the Urechis, a mud worm, which has been studied extensively here.

The March meeting is noteworthy on account of its being held the same night the earthquake occurred in So. California, March 10. This was a reunion dinner meeting. Several alumnae were detained and did not arrive from Long Beach, one of the spots where most severe damage was done. The program was enjoyed, although the Women's residence hall where the meeting was held, was rocked a few times, when follow up tremors occurred during the evening. The general conversation was along seismological lines rather than biological that evening.

Mr. Homard Hill, conchologist at Los Angeles Museum of Natural History and a member of Phi Sigma gave a lecture "Behind the scenes in the Museum". This was enjoyed by all as the speaker showed how the museum serves the Community, and that the average observer does not know the scientists and the work which is accomplished in arranging such a splendid, first rated institution. He explained in detail how the preparation of group habitats is attained, and how the models are made. The modern method of casting is quite different from the former one.

Dr. Rockwell D. Hunt, dean of the graduate school, spoke on Research. He said this subject concerns us all in a general or specific way. This is one outstanding difference or aim of the universities; 1. To seek new truth. 2. Impart skill and knowledge. 3. Function, inspire young scholars to use truth in furthering knowledge. Science is one of the most important subjects in which to do research. He developed these points in an interesting and full way. A social hour followed.

Suggestions for the remainder of the meetings this year were, for April to secure students' reports on their problems, especially those who are completing work for their degrees in biological sciences.

For the May meeting we will have initiation and installation of new officers.

Alpha Delta

Six persons have been initiated this year into Alpha Delta Chapter as active members. Eda Nihlen, Genevieve Lind, Margaret Cairncross, Frances Triggs, Gerald Brown, and Robert Scheible were the initiates. Another group is being prepared for initiation, and they will care for the destiny of Alpha Delta next year in a capable manner.

The seniors of the chapter are very much occupied at present, applying for admission to graduate and medical schools.

An undertaking of Alpha Delta Chapter which I think may be of general interest is the establishment of a prize of \$50 for the best independent work done in the fields of botany or zoology by a member of the organization. The constitution of the Society indicates that its purpose is to "promote interest in research in the Biological sciences", and perhaps this practical aid represents as forceful an encouragement and stimulus as is possible.

The first award will be made May 1, 1935, but the chapter is now placing on deposit \$30 that will be used for building up the prize fund. The work, according to the rules adopted, is to be of the nature either of laboratory, field, or library research. It may be either morphological, physiological, ecological, or historical in nature. Only junior or senior members may enter the competition.

Present plans call for all papers entered in the contest to be first subjected to a preliminary appraisal by the executive committee. Any papers which the committee adjudges eligible for the prize are to be handed to judges selected from institutions other than Lawrence.

According to the committee's report, the society reserves the privilege of extending the time of the award to May 1, 1936. This action was taken so that an award would not have to be made in case the number of competing papers were not sufficiently large or in case projects were undertaken which would require more time for their completion.

Alpha Epsilon

The first talk of the year was given by Mr. Van Dersal, this year's summer scholarship holder, followed by reports of summer work carried out by other members at Woods Hole, Cold Spring Harbor, Lake Erie and Pitt. We were very glad to learn from Mr. Van Dersal that although large parts of Pymatuning Swamp are rapidly changing, several square miles of the swamp will remain in "statu quo" after the state drainage project has been completed.

In three subsequent meetings the chapter was successful in obtaining the services of outside speakers: Dr. Horvath of Peking, China, a Soy Bean Expert, Dr. Lindegren, who spoke on Nuclear Phenomena in the Tubercle Bacillus, and three geologists, Mr. Burke, Dr. Peterson and Mr. Kay. At the best attended and most vociferous meeting of the year the species concept was hotly debated. In two subsequent meetings Dr. Williams spoke on his and Mr. Dambach's experiences in Dutch Guiana last summer, and Mr. Sweadner took us to the Bitterroot Mountains in Utah in search of hybrid moths.

The following have recently been elected to membership, and will be initiated soon:

Zukovich, Michael,—Key for trees of Pennsylvania, based on their differences in bark configuration.

Edeburn, Ralph M.,—A recent textbook of biology with accompanying laboratory manual, for use in High School teaching.

Scott, Earl B.

Graham, G. Glen,—Studies on the Pineal Gland.

Harwood, Maurice E.,—Experimental Study of Eye Accommodation.

Depta, Michael,—Evolution of Mammals.

Idzkowsky, Henry J.,—Transplantation of Mammalian Tissues into *Triturus viridescens*.

McKinnis, Elizabeth E.,—Skin Grafting in *Triturus viridescens*.

Alpha Eta

Alpha Eta Chapter has functioned regularly this school year, meeting monthly, with very good attendance both of students and faculty members. Our programs have been very interesting. Several months ago we started having on our programs short brief talks by our new mem-

bers on their specific research problem. This procedure gave the old members a better and closer interest in the new members and their problems. Among the interesting talks given—Dr. James Webster—research chemist, based his talk on his previous experience at the Boyce Thompson Institute for Plant Research in connection with "The Effect of Light Upon Plant Growth."

Mr. Harold Schnorrenberg gave an interesting and illustrated talk on horse flies.

Alpha Eta members, Professor H. I. Featherly and Clara E. Still of the Department of Botany and Plant Pathology at Okla. A. & M. College have just recently completed a monograph on the native ferns of the state. According to them forty-two species of ferns are known for Oklahoma. The authors have emphasized simplicity in their work and have reduced technical terms to a minimum so that anyone with a little knowledge of botany will be able to identify any of the native ferns of the state. In the monograph, keys are given for the identification of the respective species, and each is illustrated with a drawing. A brief description accompanies each drawing and also a list of the places in the state where it has been collected, together with the name of the collector.

The booklet, "Solving Oklahoma Farm Problems"—A Report of Oklahoma A. & M. College Agricultural Experiment Station for 1930-32, gives a complete report of all the important problems that have been carried on by most of your members of Phi Sigma, and also the other outstanding problems being solved by those that are not affiliated with our organization for the two year period. This report offers suggestions to every one of us in solving our immediate problems.

On Friday, Saturday, Sunday Sept. 24, 25, 26, Dr. F. E. Clements and his wife Dr. Edith S. Clements connected with Carnegie Institution, Washington, D. C.; Dr. A. O. Weese, Dr. Charles N. Gould, and Mr. Peierson, a graduate student, from Oklahoma University; J. Clifford Shirley of Philips University, Robert Stratton and H. I. Featherley from Stillwater met at Springfield, Missouri and went through the Ozarks to Oklahoma City. The trip was for the purpose of studying representative flora and the ecological factors of the region.

Dr. and Mrs. Clements at that time were making an extensive tour of the southwestern part of the United States in connection with their work.

Professor Robert Stratton has for the past ten years been making a phenological study of local flora of Stillwater, Oklahoma.

Each year many of our Phi Sigma members attend the Field Spring Conference of Oklahoma Academy of Science which is held at various interesting points in Oklahoma.

Professors who belong to Phi Sigma and some who do not, together with Histology, Zoology, Systematic Botany, and Ecology students, usually attend these spring meetings. This year the meeting will be held in the latter part of April at Price's Falls in the Arbuckle Mountains. All Phi Sigma students would find it profitable to attend this meeting. It will be inexpensive, but very educational, in that it will bring us closer to our problems and the outdoor life which we all appreciate.

Alpha Kappa

Alpha Kappa began 1933 by holding an initiation at the College. The following graduating seniors were elected to active membership: The Misses Galligan, Herman, Wax, and Wolfen. Dr. Minna F. Koch was elected to faculty membership and Dr. Robert A. Harper of the Department of Botany of Columbia University, to honorary membership. Our roster is now fifty-five.

Following the installation ceremonies the group listened to a talk on "Constitution and Disease" by Dr. William Hitzig of the Mount Sinai Hospital. The initiates served tea at the close of evening.

At our February meeting we had the pleasure of hearing from Miss Theodora Nelson, a faculty member. The topic of her address was "The University of Michigan Biological Station—Its Class Work and Research". Miss Nelson, who is an Assistant in Ornithology at the station during the summer gave us a very interesting account of the work going on there and all those present enjoyed a very pleasant evening, leaving with the desire to visit the place at some future date. Miss Nelson also showed us some very fine pictures.

We are looking forward to the March meeting when Dr. C. P. Henshaw, Zeta '26, will present a talk on "The Use of Radiation in Biological Investigation." Dr. Henshaw is connected with the Memorial Hospital of New York City, an institution which specializes in the treatment of cancer.

Subscription Blank

Detach this page, fill out blank spaces, include check or money order and mail to Mr. Stewart.

Date.....

To MR. E. H. STEWART,
Treasurer of Phi Sigma,
Mesa, Colorado.

Dear Mr. Stewart:

I am enclosing \$. for my subscription to THE
BIOLOGIST in the class checked on the schedule below:

- 1 Year: \$ 1.00.....
- 3 Years: \$ 2.50.....
- 5 Years: \$ 4.00... ..
- 10 Years: \$ 7.50.....
- 25 Years: \$15.00.....
- Life Sub: \$25.00.....

Name

Address

.....

WITHIN REACH OF YOUR CHAPTER FINANCES

Initiation Insignia

Does your Chapter carry out the Ritual of Initiation properly? In other words, has your Chapter the model Phi Sigma Key and the large Phi Sigma Coat of Arms required by the Ritual? They are both in easy reach of every Chapter's finances.

The Model Key, furnished in two colored gold, costs only \$1.75.

The Coat of Arms, hand-colored on 12x16 heavy paper, only \$1.25.

Address all orders, and make all checks payable to the Secretary, Dr. A. I. Ortenburger, Department of Zoology, University of Oklahoma, Norman, Oklahoma.

PHI SIGMA INSIGNIA

Membership keys may be obtained from the National Treasurer through Chapter Treasurers, or directly. In the latter case give your name, Chapter and year of initiation, *plainly*.

REVISED PRICES OF KEYS

These prices given include the Federal Tax when required.

Standard Size (official) 10K gold

Swivel ring top.....	\$5.45
Stationary ring top.....	5.00
Swivel ring top; mounted as pin; safety clasp.....	7.12
Stationary ring top; mounted as pin; safety clasp.....	6.60

Small Size 10K gold

Swivel ring top.....	5.00
Stationary ring top.....	4.50
Stationary ring top; mounted as pin; safety clasp.....	5.45

Green or White Gold

Green gold keys, additional	2.00
White gold keys, additional.....	5.00

Address correspondence to:

MR. ERWINE HALL STEWART,
Treasurer of Phi Sigma,
Mesa, Colorado.

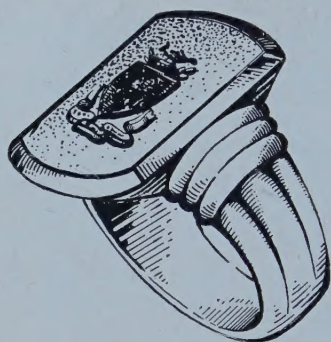
Official Phi Sigma Stationers



Chapters desiring to have official stationery printed, using the seal and color of the Society, are invited to communicate with the Printers of THE BIOLOGIST for prices and estimates.

THE W. H. KISTLER STATIONERY CO.
KISTLER BUILDING
DENVER, COLORADO

WEAR A BEAUTIFUL RING



COMPANION OF A LIFETIME
TO IDENTIFY YOU WITH YOUR
FRATERNITY IN A DIGNIFIED
AND PLEASING MANNER : :
BALFOUR-MADE RINGS ARE
SMART, DISTINCTIVE AND IN-
DIVIDUAL : : : : WEAR
A BEAUTIFUL SIGNET RING

FINE RINGS—NEW LOW PRICES

THE TRIUMPH (shown above)

one of our latest designs—THE TRIUMPH. The signet is large, matted to give a frosted softness as a background for your coat of arms, and framed in a brightly polished bevel to add brilliance and sparkle.

3077-B—In Sterling for MEN \$4.75

3078-B—In Sterling for LADIES \$4.00

¶ A more extensive selection of rings is shown in the latest

BALFOUR BLUE BOOK

along with gifts and other fraternity jewelry.

¶ Inexpensive Gifts, Party Suggestions and Favors are shown in the new

BALFOUR PARTY PLAN CATALOG

while medals, prizes, and awards are in the

BALFOUR MEDAL AND TROPHY BOOK

and last but by no means least is your

BADGE PRICE LIST

Write for your copy now.

*Balfour Prestige
built on National con-
fidence in quality, serv-
ice, and a desire to
please : 35 Branch
Offices throughout the
country. : : : :*

Your Official Jeweler

L. G. BALFOUR COMPANY
ATTLEBORO MASSACHUSETTS